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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 21187-2026

Replacing GB/T 21187-2007

Atomic absorption spectrophotometers

原子吸收分光光度计

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4 Requirements

4.1 Normal working conditions The atomic absorption spectrophotometer (hereinafter referred to as "the instrument") should be able to operate normally under the following conditions.

a) Ambient temperature. 15°C~35°C;

- b) Relative humidity not exceeding 80%;
- c) No vibrations or electromagnetic interference that could affect the use of the instrument;
- d) The room is free of corrosive gases and has good ventilation.
- e) Power supply. Voltage $220V \pm 22V$, Frequency $50Hz \pm 1Hz$;
- f) Good grounding.

4.2 Safety Requirements

4.2.1 Contact Current The contact current should meet the following requirements.

- a) Under normal operating conditions, the instrument's contact current should not exceed 0.5 mA (RMS) or 0.7 mA (peak-to-peak).

- b) Under single fault conditions, the contact current of the instrument shall not exceed 3.5mA (RMS) or 5mA (peak-to-peak).

4.2.2 Dielectric strength Under normal operating conditions, the instrument should withstand a continuous voltage test of 1500V AC RMS for 1 minute without arcing or breakdown. Phenomenon.

4.2.3 Protective grounding The impedance between the grounding protection terminal and each accessible component with a protected connection should not exceed 0.1Ω, excluding the power cord. impedance.

4.2.4 Safety of Flame Atomization Systems The flame atomization system should have accurate and reliable gas path protection and flame monitoring functions, and should automatically shut off in the event of flame extinguishing. The gas supply will automatically trigger an alarm or notification.

4.2.5 Flame gas path system sealing performance Under normal operating pressure and closed conditions, the pressure drop of the combustion gas system should not exceed [a certain value] within 15 minutes. The pressure drop in the gas system should not exceed 0.005 MPa, with a pressure drop of 0.01 MPa.

4.2.6 Safety signs Instrument atomization systems containing high-temperature components and electrical systems containing high-voltage components should have clearly visible safety signs warning of the corresponding risks. The risk level should comply with the requirements of GB 4793.1-2007.

4.3 Wavelength indication error and wavelength repeatability The instrument's wavelength

indication error and wavelength repeatability should meet the requirements of Table 1.

4.4 resolution When using a spectral bandwidth of

4.5 Baseline stability

4.5.1 Fire Magic The baseline stability of the instrument should meet the requirements of Table 2.

4.5.2 Graphite Furnace Process The baseline stability of the instrument should meet the requirements of Table 3.

4.6 Measurement Sensitivity

4.6.1 Fire Magic Depending on the type of instrument, one of the following requirements should be met.

a) Non-Zehnder type instrument. When measuring a copper element calibration solution with a mass concentration of 2.00 µg/mL, the absorbance value should not be less than 0.2;

b) Zeeman type instrument. for measuring copper element calibration solution with a mass concentration of 2.00 µg/mL, the absorbance value is not less than 0.1.

4.6.2 Graphite Furnace Process Depending on the type of instrument, one of the following requirements should be met.

a) Non-Zeeman type instrument. Measure the absorbance of a cadmium calibration solution with a mass concentration of

1.00 ng/mL and an injection volume of 20 µL. The absorbance value should be not less than 0.1, or the absorbance value should be not less than

0.05 when the injection volume is 10 µL;

b) Zeeman type instrument. Measure the absorbance of a cadmium calibration solution with a mass concentration of

1.00 ng/mL and an injection volume of 20 µL. The absorbance value is not less than 0.08, or the absorbance value is not less than

0.04 when the injection volume is 10 µL.

4.7 Limit of Detection

4.7.1 Fire Magic Depending on the type of instrument, one of the following requirements should be met.

a) Non-Zehnder type instruments. The detection limit for measuring copper calibration

solution is no greater than 0.004 µg/mL;

b) Zeeman type instrument. The detection limit for measuring copper element calibration solution is not greater than 0.005 µg/mL.

4.7.2 Graphite Furnace Process Depending on the type of instrument, one of the following requirements should be met.

a) Non-Zehnderm type instruments. The detection limit for measuring cadmium in calibration solutions is no greater than 2 pg;

b) Zeeman type instrument. The detection limit for measuring cadmium in calibration solution is no greater than

4.8 Repeatability

4.8.1 Fire Magic The repeatability of measuring the copper element calibration solution should be no greater than 1%.

4.8.2 Graphite Furnace Process The repeatability of the cadmium calibration solution should be no greater than 3%.

4.9 Absorbance indication error The instrument absorbance reading error should meet the requirements of Table 4.

4.10 Edge Wavelength Noise The instantaneous noise absorbance values for arsenic and cesium measurements should meet the requirements of Table 5.

4.11 Background Correction Capability

4.11.1 Deuterium lamp background correction method The background absorbance value should be between

0.9 and 1.1, and the correction capability should be no less than 30 times.

4.11.2 Self-absorption background correction method The self-absorption background correction capability should meet the requirements of Table 6.

4.12 Slit shifting positioning error The wavelength error caused by slit shifting should not exceed

0.3 nm.

4.13 Stability After the instrument has been running for 2 hours, it should meet the requirements of 4.5.

4.14 Instrument Appearance It should comply with the requirements of section 5.2 of GB/T 12519-2021.