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JJG

METERING & VERIFICATION REGULATION
OF THE PEOPLE'S REPUBLIC OF CHINA

JJG 821-2005

Replacing JJG 821-1993

Total organic carbon analyzer

总有机碳分析仪

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Verification regulation of total organic carbon analyzer

1 Scope

This Regulation applies to the initial verification, subsequent verification, in-use inspection, of the total organic carbon analyzer.

2 Overview

For the total organic carbon analyzer (hereinafter referred to as TOC analyzer), when measuring the carbon content in a solution or solid state sample, it oxidizes the carbon element in the sample to carbon dioxide; uses the corresponding relationship between carbon dioxide and carbon mass, to obtain the content of carbon in the sample.

The TOC analyzer is mainly composed of the following parts: Sampling device, reactor, gas-liquid separator, non-dispersive infrared carbon dioxide detector, data processing unit.

3 Measurement performance requirements

3.1 Indication error for inorganic carbon detection

The indication error limit of the inorganic carbon detection is $\pm 4\%$ (relative error).

3.2 Indication error of organic carbon detection

The indication error limit of organic carbon detection is $\pm 5\%$ (relative error).

3.3 Repeatability for inorganic carbon detection

The repeatability of inorganic carbon detection shall be better than 3%.

3.4 Repeatability for organic carbon detection

The repeatability of organic carbon detection shall be better than 3%.

4 General technical requirements

4.1 Visual inspection

4.1.1 The instrument has no damage, deformation and other phenomena, that affect its work. The instrument name, model, exit-factory serial number, manufacturing time, manufacturer name, etc. shall be complete and clear. Dangerous parts (high temperature, strong light, etc.) shall be clearly marked. The manufacturer's instruction manual is attached.

4.1.2 The structure of the instrument is complete. The components and cable plug-ins are connected reliably. The accessories are complete. All adjustment knobs, buttons, switches can work normally. The indication scale or digital display of the instrument shall be clear. The performance of the instrument, which has a recorder, shall meet the relevant technical requirements.

4.1.3 Stainless steel pipes or PTFE pipes shall be used for gas pipelines. Each joint shall be tight and firm. There is no leak under the operating pressure.

4.2 Insulation resistance and dielectric strength

4.2.1 Insulation resistance

For the instrument using 220 V AC power supply, the insulation resistance of the phase line of the instrument power supply to ground shall not be less than 20 M Ω .

4.2.2 Dielectric strength

For instruments, which use 220 V AC power supply, the dielectric strength of the phase line of the power supply to the ground shall be able to withstand the test of AC voltage 1500 V, frequency 50 Hz, for a duration of 1 min, without breakdown and arcing.

5 Control of measuring instrument

The control of the instrument includes initial verification, subsequent verification, in-use inspection.

5.1 Verification conditions

5.1.1 Environmental conditions

Ambient temperature is (20 ± 10) °C, relative humidity is $\leq 85\%$, power supply voltage

is (220 ± 22) V.

5.1.2 Standard materials and equipment for verification

5.1.2.1 Standard material for sodium carbonate purity

National grade-2 standard material. Uncertainty of purity value: 0.02%, $k = 2$.

5.1.2.2 Standard material for potassium hydrogen phthalate purity

National grade-2 standard material. Uncertainty of purity value: 0.02%, $k = 2$.

5.1.2.3 Analytical balances

The minimum division value is 0.1 mg.

5.1.2.4 Glass measuring device

Grade A.

5.1.2.5 Blank water used for calibrating the standard solution of the instrument (see Appendix A for the preparation method)

5.1.2.6 Insulation resistance gauge

500 V, grade 10.

5.1.2.7 Dielectric strength tester (voltage greater than 1.5 kV)

5.1.3 Other requirements

5.1.3.1 Instrument placement

The instrument shall be placed on the workbench stably. There is no strong light directly on the instrument, strong magnetic field, electric field interference, or vibration around the instrument. The indoor air is fresh and well ventilated.

5.1.3.2 Instrument carrier gas

The pressure and flow of the carrier gas source are stable at the specified values of the instrument.

5.2 Verification Items

The verification items are as shown in Table 1.

Appendix B

Preparation method of standard solutions

B.1 Equipment needed to prepare the solution

The balances, pipettes, volumetric flasks used shall be subject to quantitative verification.

B.2 Processing of chemical reagents

B.2.1 Processing of anhydrous sodium carbonate

Place the anhydrous sodium carbonate in a porcelain crucible. Dry it at 270 °C, for 4 h. Then place it in a desiccator to cool, for later use.

B.2.2 Processing of anhydrous potassium hydrogen phthalate

Put potassium hydrogen phthalate in a weighing bottle. Then dry it in an oven at 118 °C, for 2 h. Take it out and put it in a desiccator to cool it, for later use.

B.3 Preparation of standard solutions

B.3.1 Inorganic carbon standard solution

Accurately weigh a certain amount of anhydrous sodium carbonate. Dissolve it in pure water. Transfer it to a volumetric flask. Dilute it to the mark. Shake well. Accurately calculate the concentration of the solution.

B.3.2 Organic carbon standard solution

B.3.2.1 Potassium hydrogen phthalate standard solution

Accurately weigh a certain amount of potassium hydrogen phthalate. Dissolve it in pure water. Transfer it to a volumetric flask. Dilute it to the mark. Shake well. Accurately calculate the concentration of the solution.

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