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

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**Generic specification for LED displays
(English Translation)**

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1 Scope

This Standard specifies the method for the determination of methanol content in developer for the electronics industry by headspace gas chromatography method.

This Standard is applicable to the determination of methanol content in developer for the electronics industry. The minimum detection concentration of methanol in this method is 1 mg/kg.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 602 Chemical Reagent - Preparations of Standard Solutions for Impurity

GB/T 6682 Water for Analytical Laboratory Use - Specification and Test Methods

GB/T 9722 Chemical Reagent - General Rules for the Gas Chromatography

3 Terms and Definitions

For the purpose of this document, the terms and definitions given in GB/T 9722 apply.

4 Principle of Method

In a closed bottle, at a certain temperature, methanol molecules escape from the liquid phase to the gas phase. After a certain period of time, the methanol molecules reach a dynamic equilibrium between the gas and liquid phases. At this time, the concentration of methanol in the gas phase is proportional to its concentration in the liquid phase. The methanol in the gas phase is separated by a capillary column and detected by a hydrogen flame ionization detector. The retention time is qualitative, and

6.1 Gas chromatograph

Hydrogen flame ionization detector (FID) and data processing system.

6.2 Headspace sample-injecting device

Headspace sampler or other equivalent devices.

6.3 Headspace bottle

Commonly used volume is (22 ± 0.5) mL; lined with polytetrafluoroethylene (PTFE) - silicone rubber or butyl rubber pad and aluminum cap. Impurities that would disturb the measurement of methanol shall not be generated in the pad.

6.4 Rolling and de-capping tools

Used to seal and open headspace bottles.

6.6 Electronic Balance

The minimum division value is 0.0001g.

7.1.1 Reference conditions for gas chromatograph operation

- a) Chromatographic column type: polar capillary chromatographic column suitable for separating methanol in the developer;
- b) Carrier gas type: high-purity of nitrogen or helium;
- c) Carrier gas flowrate: 1.5mL/min;
- d) Detector type: hydrogen flame ionization detector;
- e) Column temperature: 85°C;

f) Sampler temperature: 150°C;

g) Detector temperature: 300°C.

9 Detection Limit of the Method

Prepare the developer solution and developer solution quantitatively added 20mg/kg methanol standard solution; adjust the instrument to the best working state; measure the methanol content in the developer solution with/without adding methanol standard solution; meanwhile, continuously measure at least for ten times.

The detection limit is calculated by "DL", the value is expressed by "mg/kg", and calculated according to Formula (1):

Where:

C - The value of the concentration of methanol standard solution added to the developer, in (mg/kg) [c = 20];

S - The standard deviation of the peak height or peak area of methanol in the developer solution without adding the methanol standard solution;

S1 - The average peak height or peak area of methanol in the developer solution with adding the methanol standard solution;

S0 - The average peak height or average area of methanol in the developer solution without adding the methanol standard solution;

The standard deviation of the peak height or peak area of methanol in developer solution without adding the methanol standard solution, expressed in terms of "s", and calculated by Formula (2):

Where:

xi - peak height or peak area of methanol in the developer with adding the methanol standard solution;

- average peak height or peak area of methanol in the developer without adding the methanol standard solution;

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