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GB/T 41953-2022

Paints and varnishes - Determination of water content of coating materials - Gas-chromatographic method

色漆和清漆 涂料中水分含量的测定 气相色谱法

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Paints and varnishes - Determination of water content of coating materials - Gas-chromatographic method

(ISO 23168:2019 Paints and varnishes - Determination of water content - Gas-chromatographic method, IDT)

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Foreword

This document is drafted in accordance with the provisions of GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

This document is equivalent to ISO 23168:2019 "Paints and varnishes - Determination of water content - Gas-chromatographic method".

This document has undergone the following minimal editing changes:

——in order to be in line with existing standards, the name of the standard has been modified to "Paints and varnishes - Determination of water content of coating materials - Gas-chromatographic method".

Attention is drawn to the possibility that some of the contents of this document may be the subject of patent rights. The issuing body of this document shall not be held responsible for identifying any or all such patent rights.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee 5 on Coating Materials and Paints Standardization (SAC/TC 5).

The drafting units of this standard are as follows: CNCCC Changzhou Paint and Coatings Industry Research Institute Co., Ltd., Changzhou Guanghui New Material Research Institute Co., Ltd., Zhejiang Yutong New Material Co., Ltd., Ningbo Xin'an Dope Co., Ltd., Shenzhen Guangtian Environmental Protection Paint Co., Ltd., Anhui Jianghuai Automobile Group Corp., Ltd., China Paints (Shenzhen) Co., Ltd., Changzhou Special Coating Co., Ltd., Carpoly Chemical Group Co., Ltd., Fujian Wanan Industry Group Co., Ltd., Hubei Baster Science and Technology Co., Ltd., SKSHU Paint Co., Ltd., Chongqing Sanxia Paints Co., Ltd., Guohengxin (Changzhou) Testing and Certification Technology Co., Ltd., Biuged Precise Instruments (Guangzhou) Co., Ltd., Shuangta Paint Technology Co., Ltd., SGS-CSTC Standards Technical Services (Tianjin) Co., Ltd., Baoji Chushi Metal Detection Limited Liability Company, Dongguan DaXing Chemical Industry Co., Ltd., Guangdong Jiasheng Environmental Protection High-tech Materials Co., Ltd., Beijing Qiyizhou New Materials Technology Co., Ltd, Qingyuan High-tech Huayuan Science and Technology Collaborative Innovation Research Institute Co., Ltd., Jiangsu Canlon Building Materials Co., Ltd., New Materials Co., Ltd. Changsha Zuxing, Haolisen Chemical Technology (Jiangsu) Co., Ltd., Shanghai Customs Industrial Product and Raw Material Testing Technology Center, Shanghai Baolijia New Materials Co., Ltd., Guangdong Youzhi New Materials Co., Ltd., Fujian Shangruo Engineering Technology Co., Ltd., Yingde Yingze Chemical Technology Co., Ltd., Yingde SMACH Chemical Industry Co., Ltd., Qingyuan HAOYU Chemical Technology Co., Ltd., Sichuan Dangerous Chemical Products Quality Supervision and Inspection Institute, Yingde City Zuotong Chemical Co., Ltd., Xiamen Dongshun Technology Group, Qingyuan Ming Yu S-Tech Materials Co., Ltd., Eternal MATERIALS (Guangdong) Co., Ltd., Shanghai Clivia New Material Co., Ltd., Zhejiang Anyi New Material Co., Ltd., Fuzhou Xinlongda Civil Engineering Testing Co., Ltd., and Fujian Tongyi New Materials Technology Co., Ltd.

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1 Scope

This document specifies a method for the determination of the water content in water-borne coating materials and their raw materials by using a gas chromatograph.

This document is applicable to the determination of the water content in water-borne coating materials. The preferred working range of this test method is from a water mass fraction of 15% to a water mass fraction of 90% but the method can be applied outside of this range.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 760 Determination of water - Karl Fischer method (General method)

ISO 1513 Paints and varnishes - Examination and preparation of test samples

Note: GB/T 20777-2006 Paints and varnishes - Examination and preparation of samples for testing (ISO 1513:1992, IDT)

ISO 3696 Water for analytical laboratory use - Specification and test methods

Note: GB/T 6682-2008 Water for analytical laboratory use - Specification and test methods (ISO 3696:1987, MOD)

ISO 4618 Paints and varnishes - Terms and definitions

Note: GB/T 5206-2015 Paints and varnishes - Terms and definitions (ISO 4618:2014, IDT)

ISO 15528 Paints, varnishes and raw materials for paints and varnishes - Sampling

Note: GB/T 3186-2006 Paints, varnishes and raw materials for paints and varnishes - Sampling (ISO 15528:2000, IDT)

3 Terms and Definitions

For the purposes of this document, the terms and definitions given in ISO 4618 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

——ISO Online browsing platform: available at https://www.iso.org/obp;

——IEC Electropedia: available at http://www.electropedia.org.

3.1 Ready for use

State of a product when it is mixed in accordance with the manufacturer's instructions in the correct proportions and thinned if required using the correct thinners so that it is ready for application by the approved method

[Source: ISO 11890-2:2013, 3.4]

4 Principle

A suitable amount of the test sample is internally standardized, diluted with appropriate solvent, and then injected into a gas chromatographic column that separates water from other components, after which the water is detected by a thermo conductivity detector and quantified from the peak areas using the internal standard.

5 Apparatus

5.1 Gas chromatograph

The gas chromatograph shall be set up and used in accordance with the manufacturer's instructions. All of the instrumental parts coming into contact with the test sample shall be made of a material (e.g. glass) which is resistant to the sample and will not change it chemically.

5.2 Sample injection system

The instrument shall have a variable temperature injection block with a sample splitter. The injection temperature shall be capable of being set to an accuracy of 1 ℃. The split ratio shall be adjustable and capable of being monitored. The sample splitter insert shall contain silanized glass wool to retain non volatile constituents, and shall be cleaned and provided with new glass wool packing or replaced as required to eliminate errors due to residues of binder or pigment (i.e. adsorption of compounds).

5.3 Oven

The oven shall be capable of being heated between 40 ℃ and 300 ℃ both isothermally and under programmed temperature control. It shall be possible to set the oven temperature to within 1 ℃. The final temperature of the temperature programme shall not exceed the maximum operating temperature of the capillary column (see 5.5).

5.4 TCD

Thermo conductivity detector (TCD), capable of being operated at temperatures up to 300 ℃. The injection volume, split ratio and gain setting shall be optimized so that the signals (peak areas) used for the calculation are proportional to the amount of substance.

5.5 Capillary column

The column shall be made of glass or fused silica. Columns of sufficient length to resolve water from other compounds and of maximum internal diameter 0.53 mm, based on bonded porous polymer technology shall be used. Columns shall also show good stability and reproducibility with samples containing large amounts of water. Other columns proved to be equally suitable may also be used.

5.6 Injection syringe

The injection syringe shall have a capacity of at least twice the volume of the sample to be injected into the gas chromatograph.