# GB

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# Limit of Harmful Substances of Woodenware Coatings

木器涂料中有害物质限量

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# Limit of Harmful Substances of Woodenware Coatings

## 1 Scope

This Standard specifies the product classification, requirements, test methods, inspection rules, packaging marks and implementation of the standards involved in the allowable limits of substances harmful to humans and the environment in woodenware coatings.

This Standard is applicable to all types of woodenware coatings for on-site and factory coatings such as filler, primer and topcoat except for special functional coatings such as Lacquer, bridging paint, wood stain, open effect paint, etc.

## 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 1725-2007 Paints Varnishes and Plastics – Determination of Non-Volatile-Matter Content

GB/T 3186 Paints Varnishes and Raw Materials for Paints and Varnishes – Sampling

GB/T 6682-2008 Water for Analytical Laboratory Use - Specification and Test Methods

GB/T 6750-2007 Paints and Varnishes - Determination of Density - Pycnometer Method

GB/T 8170-2008 Rules of Rounding off for Numerical Values & Expression and Judgement of Limiting Values

GB/T 9750 Marks for Package of Coating Product

GB/T 9754-2007 Paints and Varnishes - Determination of Specular Gloss of Non-Metallic Paint Films at 20°, 60°and 85°

GB/T 18446-2009 Binders for Paints and Varnishes - Determination of Monomeric

Diisocyanate in Isocyanate Resins

GB/T 23985-2009 Paints and Varnishes - Determination of Volatile Organic Compound (VOC) Content - Difference Method

GB/T 23986-2009 Paints and Varnishes - Determination of Volatile Organic Compound (VOC) Content - Gas-Chromatographic Method

GB/T 23990-2009 Determination of the Contents of Benzene, Toluene, Ethylbenzene, and Xylene in Coatings by Gas Chromatography

GB/T 23991-2009 Determination of Soluble Harmful Elements Content of Coatings

GB/T 23992-2009 Determination of Chlorohydrocarbon Content in Coatings - Gas Chromatographic Method

GB/T 23993-2009 Determination of Formaldehyde Content of Waterborne Coatings -Spectrophotometric Method with Acetylacetone

GB/T 30646-2014 Determination of Phthalate Plasticizers Content in Coatings - Gas Chromatography/Mass Spectrometry Method

GB/T 30647-2014 Determination of Harmful Elements Total Content of Coatings

GB/T 31414-2015 Water Based Coatings - Determination of Surfactant - Alkylphenol Ethoxylates

GB/T 34675-2017 Determination of Volatile Organic Compound (VOC) Content in Radiation Curable Coatings

GB/T 34682-2017 Determination of Volatile Organic Compound (VOC) Content in Reactive Diluent Containing Coatings

GB/T 36488-2018 Determination of Polycyclic Aromatic Hydrocarbons in Coatings

# 3 Terms and Definitions

For the purpose of this document, the following terms and definitions apply.

### 3.1 Polyurethane coatings

A type of coating that uses polyurethane resin formed by the reaction of polyisocyanate and active hydrogen-containing compound as the main film-forming material.

### 3.2 Nitrocellulose coatings

# 6 Test Methods

### 6.1 Sampling

Sampling according to the provisions of GB/T 3186, or according to the agreed method. The sampling amount is determined according to the inspection requirements.

### 6.2 Test methods

#### 6.2.1 VOC content

##### 6.2.1.1 Density

Perform according to the provisions of GB/T 6750-2007; the test temperature is (23±0.5) °C.

##### 6.2.1.2 Luster

Perform according to the provisions of GB/T 9754-2007. Use a wet film preparation device with a groove depth of (100 ± 2) μm to prepare a sample plate on a flat glass plate. The varnish shall use black glass or flat glass with a matte black paint on the back as the substrate. After drying the sample plate for 48h at a temperature of (23±2) °C and a relative humidity of (50±5) %, test it with a 60° specular gloss meter.

##### 6.2.1.3 Moisture content

Perform according to the provisions of Appendix A.

##### 6.2.1.4 VOC content in solvent-based coatings (polyurethane, nitrocellulose, alkyd and their corresponding fillers)

The non-aqueous solvent-based paint shall be carried out in accordance with the provisions of GB/T 23985-2009. The non-volatile content is carried out in accordance with the provisions of GB/T 1725-2007. Weigh about 1g of the sample and the baking condition is (105±2) °C/1h. The moisture shall not be measured, the moisture content is set to zero. The calculation of VOC content is carried out according to 8.3 of GB/T 23985-2009.

Solvent-based coatings intentionally added with water shall be carried out in accordance with the provisions of GB/T 23985-2009. The non-volatile content is carried out in accordance with the provisions of GB/T 1725-2007. Weigh about 1g of the sample and the baking condition is (105±2) °C/1h. The calculation of VOC content is carried out according to 8.4 of GB/T 23985-2009.

##### 6.2.1.5 VOC content in solvent-based coatings (unsaturated polyester and its filler)

#### 6.2.5 Total sum content of glycol ether and ether ester

Perform according to the provisions of GB/T 23986-2009. The calculation of the content of glycol ether and ether ester is carried out according to 10.2 in GB/T 23986-2009; and converted into milligrams per kilogram (mg/kg).

#### 6.2.6 Benzene content, total sum content of toluene and xylene (including ethylbenzene)

Perform according to the Method A specified in GB/T 23990-2009. The calculation of benzene content, toluene and xylene (including ethylbenzene) content are carried out according to 8.4.3 of GB/T 23990-2009.

#### 6.2.7 Total sum content of benzene series

Perform according to the Method B specified in GB/T 23990-2009. The calculation of benzene series content is carried out according to 9.4.3 of GB/T 23990-2009.

#### 6.2.8 Total sum content of polycyclic aromatic hydrocarbons

Perform according to the provisions of GB/T 36488-2018.

#### 6.2.9 The total sum content of free diisocyanate

Perform according to the provisions of GB/T 18446-2009.

#### 6.2.10 Methanol content

Perform according to the provisions of GB/T 23986-2009. The calculation of methanol content is carried out according to 10.2 of GB/T 23986-2009.

#### 6.2.11 Total sum content of halogenated hydrocarbons

Perform according to the provisions of GB/T 23992-2009. The calculation of halogenated hydrocarbon content is carried out according to 8.5.2 of GB/T 23992-2009.

#### 6.2.12 Total sum content of phthalic acid ester

Perform according to the provisions of GB/T 30646-2014.

#### 6.2.13 Total content of alkylphenol ethoxylates

Perform according to the provisions of GB/T 31414-2015.

## 7 Inspection Rules

### 7.1 Type inspection

# Appendix A

## (Normative)

## Determination of Moisture Content – Gas Chromatography

### A.1 Reagents and materials

**A.1.1** Distilled water: meet the requirements of Grade-3 water in GB/T 6682-2008.

**A.1.2** Dilution solvent: The organic solvent used to dilute the specimen and dried by molecular sieve does not contain any substances that interfere with the test. The purity is at least 99% (mass fraction), or the purity is known. For example, dimethylformamide and so on.

**A.1.3** Internal standard substance: a compound that does not exist in the specimen and is dried by molecular sieve; and the compound may be completely separated from other components on the chromatogram. The purity is at least 99% (mass fraction), or the purity is known. For example, isopropanol, etc.

**A.1.4** Molecular sieve: the pore size is 0.2nm~0.3nm; and the particle size is 1.7mm~5.0mm. Molecular sieve shall be used after regeneration.

**A.1.5** Carrier gas: hydrogen or helium, purity ≥99.995%.

### A.2 Apparatus

**A.2.1** Gas chromatograph: equipped with thermal conductivity detector and temperature program controller.

**A.2.2** Chromatographic column: capillary column of styrene-divinylbenzene porous polymer.

NOTE: Other chromatographic columns that meet the inspection requirements may also be used.

**A.2.3** Sampler: Micro syringe, 10μL.

**A.2.4** Sample bottle: about 10mL glass bottle with a sealable cap.

**A.2.5** Balance: the actual division value $d$=0.1mg.

### A.3 Gas chromatography test conditions

**A.3.1** Chromatographic column: capillary column of styrene-divinylbenzene porous polymer, 25m×0.53mm×10μm.

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