

ICS 91.080.20  
CCS P 23

**LY**

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

**LY/T 3147-2019**

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**Coating materials (paints and varnishes) for exterior wood:  
classification and weathering performance specification  
(English Translation)**

**Issued on: October 23, 2019**

**Implemented on: April 1, 2020**

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**Issued by: State Forestry and Grassland Administration**

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### Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed and managed by the National Timber Standardization Technical Committee Structural Timber Subcommittee (SAC/TC41/SC4).

This standard was drafted. Northeast Forestry University, Institute of Wood Industry, Chinese Academy of Forestry.

### 1 Scope

This standard specifies the terms and definitions, classification, performance requirements, testing and evaluation methods of coatings for outdoor wood.

This standard applies to outdoor wood varnishes and colored paints.

### 2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 1741-2007. Determination of mold resistance of paint films GB/T 1766-2008. Paints and varnishes. rating methods for coating ageing GB/T 3181-2008. Paint film color standards GB/T 3186-2006. Sampling of paints, varnishes and raw materials for paints and

varnishes GB/T 4893.4-2013. Physical and chemical properties of paint films on furniture surfaces. Part 4. Cross-cut determination method for adhesion GB/T 4893.6-2013. Physical and chemical properties test of paint film on furniture surface. Part 6. Determination of gloss GB/T 4893.9-2013. Physical and chemical properties test of furniture surface paint film Part 9. Impact resistance test of furniture surface paint film GB/T 5206-2015/ISO 4618.:2004. Paints and varnishes. terms and definitions GB/T 9276-1996. Test method for natural weather exposure of coatings GB/T 13452.2-2008. Paints and varnishes. Determination of paint thickness GB T 17657-2013 Test methods for physical and chemical properties of wood-based panels and facing wood-based panels GB/T 33568-2017 Weathering grade and evaluation method for outdoor wood finishing surface GB/T 33569-2017 Test method for artificial aging of wood-coated surfaces for outdoor use ISO 16053-2018 Paints and Varnishes-Outdoor Coatings and Coating Systems for Wood-Natural Aging Test Methods

### 3 Terms and definitions

The terms and definitions defined in GB/T 5206-2015 and the following apply to this document. For ease of use, the following GB/T is repeatedly listed 5206-2015 some terms and definitions

3.1 Coating materials for exterior wood Paint for outdoor decoration on the surface of wood for decoration and protection.

Biocide

Coating system

A combination of all single coatings formed by a coating to be applied or already applied to a substrate.

**Note:** The actual system can be characterized by the number of single coatings included.

[GB/T 5206-2015, definition 2.54] 3.3

Table paint finishing coat; top coat

The last single coat in a coating system.

[GB/T 5206-2015, definition 2.112] 3.4 Intermediate coating;

Any layer of coating between the primer and the topcoat.

Priming coat

The first single coat in a coating system.

[GB/T 5206-2015, definition 2.207] 3.6 Film formation the process of changing the applied paint from liquid to solid. For powder coatings, a process from liquid phase to solid phase is required.

**Note:** Film formation is caused by drying and/or hardening, both of which can occur simultaneously.

[GB/T 5206-2015, definition 2.110] 3.7 Ageing Over time, one or more properties of the paint film gradually change from the initial state.

[GB/T 5206-2015, definition 2.11].

#### Flexibility

The ability of a dry paint film or single coating to deform without breaking with its substrate.

[GB/T 5206-2015, definition 2.120] 3.9 Hiding power the ability of a coating to cover the color or chromatic aberration of a substrate.

[GB/T 5206-2015, definition 2.138] 3.10 Water permeability the ability of liquid water or water vapor to penetrate the finishing system.

#### 3.11

#### Water absorption

The ability of the painted surface area to absorb liquid water.

#### 3.12

#### Chalking

Due to the degradation of one or more components in the paint film or single coating, the appearance of loosely adhered powder on the surface is exhibited.

[GB/T 5206-2015, definition 2.41] 3.13 Adhesion strength at the interface between a solid surface and another material, the phenomenon of adhesion occurs by molecular force.

[GB/T 5206-2015, definition 2.7]

### **4.1 Classification according to the appearance of the paint film**

The appearance classification of paint film includes the following characteristics.

- 1) Dry film thickness of paint film;
- 2) Covering ability;
- 3) Gloss

#### **4.1.1 Paint film thickness**

The dry paint film thickness is measured in accordance with 5.2 Method 6A in GB/T 13452.2-2008, and the unit is expressed in micrometers ( $\mu\text{m}$ ). Measured the paint film should be coated on a smooth and flat substrate, and the thickness part is above the surface of the wood, and the paint penetrating into the wood is not included. paint the film thickness is divided into four grades of ultra-thin, low-thickness, medium-thickness, and ultra-thickness. See Table 1.

Table 1 Grades of paint film thickness

Classification thickness value (average value) Ultra thin less than 5μm Low thickness between 5μm and 20μm Medium thickness between 20μm and 60μm Ultra-thickness greater than 60 μm

#### 4.1.2 Covering ability of paint film

There are three types of opaque, translucent and transparent according to the covering ability of the paint film. See Table 2 for the description of the covering effect.

Table 2 Grading ability of paint film

Classification cover effect description Opaque finish system completely covers the color and pattern of the substrate, but does not cover the surface contour of the substrate Translucent finish system does not completely cover the surface color and pattern of the substrate Transparent through the coating system, the color and texture of the substrate surface are clearly visible 1.1.1 4.1.3 Gloss of paint film According to GB/T 4893.6-2013, the reflectance of the paint film is measured at 60 °. Film gloss is divided into matt, semi-matt, semi-gloss, and bright Five levels of light and high light, see Table 3.

Table 3 Classification of coatings according to film gloss

Classification According to GB/T 4893.6-2013, the reflectance measured at 60 ° Matte below 10 Semi-matt between 10 and 35 Semi-gloss between 35 and 60 Light between 60 and 80 High light above 80

1.1.2 Note. The gloss of the paint film is affected by environmental conditions, the nature of the substrate itself, test methods and application conditions. See Appendix A for specific information.

1.1.3 4.2 According to the requirements of use Based on the different dimensional stability requirements of different wooden members in wooden structures, the water permeability requirements of coatings coated on wooden members are also different.

different. According to the requirements of the dimensional stability of wood components for different purposes, the applicable coatings are divided into three levels. stable, relatively stable and unstable, see table 4.

Table 4 Classification by coating application

Dimensional stability of paint-grade wood members Only small changes in the size of the stabilizing wood members are required.

Good water resistance Wooden doors and windows the size of the relatively stable wood member allows some variation, the coating has Certain waterproof ability Wooden component wall panels, wooden structure houses, outdoor furniture Unsteady dimensional change of unstable wood members, coating waterproof Unlimited ability Laminate wall