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Replacing GB/T 15102-1994

Surface decorated wood-based panels with paper impregnated thermosetting resins

浸渍胶膜纸饰面人造板

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Foreword

This Standard is a revision to GB/T 15102-1994 *Surface decorated wood-based panels with paper impregnated thermosetting resins*.

The indicators and inspection methods of light fastness in this Standard non-equivalently use Pr EN 14323-2001 *Wood-based panels - Melamine faced panels for interior uses - Characteristics and test methods*.

Compared with GB/T 15102-1994, the main technical changes in this Standard are as follows:

- added classification categories;
- improved appearance quality requirements for each grade of products;
- adjusted width specifications;
- adjusted sample preparation methods;
- modified scratch test method;
- added formaldehyde release limit indicators and test methods;
- added light fastness indicators and test methods.

Since the date of implementation of this Standard, it replaces GB/T 15102-1994.

Annex A of this Standard is normative.

This Standard was proposed by China's State Forestry Administration.

This Standard shall be under the jurisdiction of National Panel Standardization Technical Committee.

Main drafting organization of this Standard: China Academy of Forestry Wood Industry Research Institute.

The drafting organizations of this Standard: State-owned Songjiang plywood factory, Fuzhou Panel Factory, Shengxiang Industrial (Shenzhen) Co., Ltd., Foshan Nanhai Yiu Tung Wah Furniture Sheet Co., Ltd., Chengdu Jian Cheng Industrial Co., Ltd., Yuehai Decoration Materials (Zhongshan Co., Ltd.), Jilin Sen Industrial Co., Ltd., Xia Te Decoration Materials (Shanghai) Co., Ltd., Shanghai Tianxiang Quality Technology Services Limited, Sichuan Shengda Products Co., Ltd., US Copanot Equipment Company (Shanghai Office), Hebei Hengyuan Industrial Group Co., Ltd.

Surface decorated wood-based panels with paper impregnated thermosetting resins

1 Scope

This Standard specifies the classification, requirements, test methods, inspection rules as well as marks, packaging, transport and storage of surface decorated wood-based panels with paper impregnated thermosetting resins.

This Standard applies to the decorative plate of impregnated amino resin film, paved on the particleboard, fiberboard and other substrates plywood surface, formed by thermal pressure.

This Standard is not applicable to impregnated paper laminated wooden floor.

2 Normative references

The following standards contain the provisions which, through reference in this Standard, constitute the provisions of this Standard. For dated references, subsequent amendments (excluding corrections) or revisions do not apply to this Standard. However, the parties who enter into agreement based on this Standard are encouraged to investigate whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB 250-1995, *Gray scale for assessing change in color* (idt ISO 105-A02:1993)

GB 730-1998, *Textiles - Tests for color fastness - Blue wool STANDARDS for color fastness to light and weathering* (idt ISO 105-B:1994)

GB/T 2828.1-2003/ISO 2859-1:1999, *Sampling procedures for inspection by attribute - Part1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

GB/T 17657-1999, *Test methods of evaluating the properties of wood-based panels and surface decorated wood-based panels*

GB 18580, *Indoor decorating and refurbishing materials -- Limit of formaldehyde emission of wood-based panels and finishing products*

GB/T 19367.1-2003, *Wood-based panels - Determination of thickness, width*

and length of panels

GB/T 19367.2-2003, *Wood-based panels - Determination of squareness and straightness of panels*

3 Terms and definitions

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

3.1 surface decorated wood-based panels with paper impregnated thermosetting resins

the decorative sheet that uses particleboard, fiberboard and other wood-based as substrate, impregnated thermosetting resins paper as finishing material

3.2 color unmatching

the color of a pattern is visually different from the color of a given standard

3.3 misalignment between panel and impregnated paper

product panel out of paper caused by film paper and substrate misalignment, including decorative white paper printing, cracks

3.4 tearing of impregnated paper

product surface rupture marks due to partial fracture of film paper

3.5 frosting mark

white flower

opaque white piebald on product surface

3.6 water mark

also known as water stain, fog mark on product surface

3.7 porosity of surface

pinhole defects on product surface

3.8 spots, dirt and similar surface defects

dust in base paper, ink marks on printing, and decorative defects caused by impurities in the process

3.9 bare substrate spots due to defective surface covering

6.2.4 Inspection of verticality

In accordance with 5.1 in GB/T 19367.2-2003.

6.2.5 Measurement of edge straightness

In accordance with 5.2 in GB/T 19367.2-2003.

6.2.6 Inspection of warpage

Place the product on a level table with the concave surface facing up. Use fine steel tire to connect two opposite angles of panel. Measure the maximum chord length with steel ruler, to the nearest of 0.5 mm. The ratio of the maximum chord height to the diagonal length is the warpage, represented in percentage, to the nearest of 0.1%.

6.3 Physical and chemical properties test methods

6.3.1 Preparation and dimensions of test specimens and test pieces

6.3.1.1 The samples and test specimens shall be extracted from the products being stored for more than 24h after production.

6.3.1.2 Cut the sample of surface decorated wood-based panels with paper impregnated thermosetting resins into five test specimens as shown in Figure 5. Each test specimen shall be marked with number and “Δ” on the right top. Specimens 1, 3, 5 are used to prepare “number” test pieces, 2, 4 are for “random” test pieces. See Table 5 for the size, quantity and number of test pieces. The prepared test pieces shall have straight edges; the adjacent two shall be at right angles. The specifications of number test pieces prepared from specimens 1, 3, 5 shall be in accordance with Figure 2. When it has defects on the specified test piece preparation position, it shall appropriately move the preparation position of test piece. When the panel thickness is greater than 25 mm, the test piece of static bending strength (size exceeding 550 mm) may be extracted randomly in the sample panel, maintain 3 pieces respectively for vertical and horizontal directions. The test pieces of other numbers shall maintain the original directions.

6.3.8.2 Instruments and tools

Carry out in accordance with 4.13.2 of GB/T 17657-1999.

6.3.8.3 Test pieces

Prepare test pieces according to 6.3.1 of this Standard. Mill a groove with an inner diameter of (35.7 ± 1) mm on the central part of testing plane of the test piece, with a groove width of about 3 mm, groove depth into substrate surface. Use sand paper to slightly sand the test piece after groove milled. And remove the dusts. If the thickness of test piece is less than 10 mm, it shall need to bond 2~3 test pieces. The surfaces of bonded test piece shall represent the upper and lower surfaces of panel, respectively.

6.3.8.4 Methods

Carry out in accordance with 4.13.4 of GB/T 17657-1999.

6.3.8.5 Expression of results

Carry out in accordance with 4.13.5 of GB/T 17657-1999.

6.3.9 Determination of Surface resistance to hot and cold cycles

Carry out in accordance with 4.31 of GB/T 17657-1999.

6.3.10 Determination of surface resistance to scratch

6.3.10.1 Principle

The surface resistance to scratch is to detect the diamond needle engraving ability of the decorative layer surface of the product under the resistance of a certain force.

6.3.10.2 Instruments

Carry out in accordance with 4.29.2 of GB/T 17657-1999.

6.3.10.3 Test pieces

Prepare according to 6.3.1.

6.3.10.4 Methods

Wipe the test piece surface clean. Fix the testing surface up on the scratch test stage. Adjust the beam height, so that when diamond tip contacts with the surface of the test piece, the edge of the beam shall be at a horizontal position. Move the weight to 1.5N to start the stage rotation so as to make the diamond needle to draw two concentric circles on the test piece surface. The distance

between the scratch on the radius direction and the scratch is 1mm ~ 2mm.

Remove the test piece. Under the natural light, at a position about 40 cm from test piece surface, observe with naked eyes the scratched part on the test piece surface from any angle.

6.3.10.5 Expression of results

See if there is any full circle scratch in a row on the test piece surface.

6.3.11 Determination of size stability

Carry out in accordance with 4.34 of GB/T 17657-1999.

6.3.12 Determination of surface resistance to abrasion

6.3.12.1 Principle

It is to detect the surface abrasion loss and ability of retaining decorative pattern after a certain number of rotation in relative friction between the surface decorative layer and a certain granularity of grinding wheel.

6.3.12.2 Instruments and materials

6.3.12.2.1 Instruments

Carry out in accordance with 4.38.2.1 of GB/T 17657-1999.

6.3.12.2.2 Materials

- a) dry abrasive cloth A P180;
- b) double-sided tape or glue;
- c) skim gauze.

6.3.12.3 Test pieces

Prepare according to 6.3.1.

6.3.12.4 Test steps

6.3.12.4.1 Wipe the test piece surface clean with skim gauze and weigh, to the nearest of 1 mg. If the thickness of the test piece affects the level of grinding wheel support, the test piece shall be sawed thin.

6.3.12.4.2 Mount the test piece face up on the wear tester. Glue the abrasive wheel with emery cloth, and balance according to the following conditions: at a relative humidity of $(65 \pm 5)\%$, at a temperature of $(20 \pm 2)^{\circ}\text{C}$, placing more than

The test method for formaldehyde release limit shall be carried out with the measurement method for formaldehyde release limit of surface decorated wood-based panels specified in GB 18580.

6.3.19 Determination of light fastness

6.3.19.1 Principle

Remove part of the test piece from the sample and expose with the blue wool under a xenon arc lamp. The amount of exposure is determined by the blue wool standard change. The light fastness of the sample shall be evaluated by comparing the changes of the exposed and unexposed test specimens under a certain exposure amount.

6.3.19.2 Equipment

- a) Xenon arc lamp: air-cooled or water-cooled (see Annex A). For the test piece parallel to the plane of the test piece holder, the difference in radiation between any two points on the surface shall not be greater than 10%. The amount of radiation (radiant energy per unit area) is measured with a radiometer.
- b) Rating light box: the inner wall is neutral ash; the color is about between the discoloration gray card level 1 and 2 (similar to Munsell N5); the top is equipped with an artificial light source which produces a color temperature (6500 ± 200) K and a light source of at least 800 lx illumination on the surface of the test piece. Rating light box is placed on a certain location, the surrounding lighting conditions do not affect the observation assessment test piece.

6.3.19.3 Materials

- a) Blue wool standard 1~8 (in accordance with GB 730-1998);
- b) Gray sample card used for assessment of color change (in accordance with GB 250-1995);
- c) Ethanol, 95% (volume fraction), industrial grade;
- d) Skim gauze.

6.3.19.4 Test piece

The length and the width of the test piece shall be determined according to the shape and size of the test piece holder. The test piece taken shall include all the colors on the sample. The thickness of test piece is (5 ± 1) mm. In air-cooled equipment, the area of the test piece that is usually used is not less than 45 mm × 20 mm. In water-cooled equipment, the area of the test piece that is usually

used is not less than 70 mm × 20 mm.

The xenon arc lamp must be at an equal distance from the test piece surface and from the standard surface of blue wool.

6.3.19.5 Test conditions

Black standard temperature: $(65 \pm 3)^{\circ}\text{C}$;

Relative humidity: $(50 \pm 5)\%$.

6.3.19.6 Method

Wipe the test piece surface with a little ethanol in skim gauze clean, dry it. Cover half of the test piece and a set of blue wool standard with a covering. Expose under xenon arc lamp according to the conditions specified in 6.3.19.5. When the color difference between the exposure of blue wool standard grade 6 and the unexposed part reaches to gray sample card grade 4, the exposure shall end. Then take the test piece and blue wool standard out together. Remove the covering. In the rating light box, use a gray sample card to assess the appropriate level of discoloration of the test piece.

At a distance about 50 cm from the test piece, with normal vision (or corrected to normal vision), observe the color change of test piece surface at any angle. In order to avoid color misdemeanors due to photochromism and light fastness, it shall place the test piece in a dark place before the assessment of the light fastness. Perform when the temperature is balanced for 24h.

6.3.19.7 Expression of results

The light fastness shall be expressed in greater than, equal to or less than gray sample card grade 4.

7 Inspection rules

7.1 Inspection classification

The inspection consists of exit-factory inspection and type inspection.

7.1.1 Exit-factory inspection

The exit-factory inspection includes:

- a) appearance quality inspection;
- b) specification inspection;
- c) surface resistance to abrasion, surface resistance to pollution, surface

Annex A

(normative)

Xenon arc lamp device

A.1 Air-cooled xenon arc lamp device

A.1.1 Description and conditions of use

A.1.1.1 The test equipment used is equipped with one or more air-cooled xenon arc lamps as the radiation source. In different sizes and types of devices, different types and sizes of lamps are used. These lamps have different operating power ranges. In different types of exposure devices, the lamp power may be different. When the specimen is exposed on a test rack, the irradiance on the exposed surface of the specimen shall be at the specified level.

A.1.1.2 The radiation system consists of a xenon arc lamp fixed in the center of the chamber or three lamps arranged symmetrically, depending on the type of installation. The heat absorption system can consist of one or all of the following components: an air or water-cooled heat absorber (UV and visible light reflectors can be connected to the heat absorber so as to reflect light radiation), one or more quartz sleeves allowing the compressed air to circulate through the inner sleeve, with the water passing between the concentric quartz sleeves. All cooling air shall be discharged outside the laboratory building. The inner surface of the quartz sleeve can also be coated with an infrared reflective coating to further reduce the heat emitted by the lamp and prevent some of the heat from entering the chamber.

Daylight passing through a windowpane requires that the light from the light source is filtered so that the sample receives the light at the low end of the spectrum near the daylight passing through the windowpane.

The transmittance of the infrared absorption filter and the window glass filter varies depending on the usage time. Therefore, this filter shall be scrapped 4000h after use, or to be handled in accordance with the device manual.

In the case of using this equipment for exposure, the spectral irradiance at 300nm ~ 400nm shall be selected as $(50 \pm 3) \text{ W/m}^2$, or $(1.10 \pm 0.02) \text{ W}/(\text{m}^2 \cdot \text{nm})$ at 420nm.

For the device of which the lamp power can be changed within a wide range, regardless of sample holder rotation, UV irradiance regulation has nothing to do with the operation mode. Xenon arc lamps shall be discarded when the set spectral irradiance can no longer be reached by automatic control.

The spectral irradiance at 420 nm is chosen to be $(1.10 \pm 0.02) \text{ W}/(\text{m}^2 \cdot \text{nm})$. As the light intensity decreases with the use of time, when the specified spectral irradiance can no longer be reached through automatic control, the xenon arc lamp shall be scrapped.

A.2.1.3 All types of xenon arc lamp exposure devices are equipped with suitable triggers, reactance transformers and indicating and control equipment so as to manually or automatically control the lamp power. For manually controlled devices, the lamp power shall be periodically adjusted to maintain the specified spectral irradiance.

A.2.1.4 For cooling the xenon arc lamp, the parts of the lamp shall be passed with distilled or deionized water at a flow rate of at least 378.5 L/h. In order to prevent contamination and reduce the formation of sediment, the water can be purified with a mixed bed deionizer close to the front of the lamp. The cooling water of lamp recycling is cooled by a heat exchanger and prevented from contamination. It shall use tap water or refrigerant as a heat exchange medium.

A.2.1.5 The device used in this Standard is equipped with a countdown timer to control the exposure time. Some devices are also equipped with a light monitor allowing the device to be shut down as soon as a preset radiation exposure is reached.

A.2.2 Temperature and humidity control

A.2.2.1 In the test using this Standard, accurate and tight control of temperature is extremely important. Temperature measurement and control use black standard thermometer or blackboard thermometer. This thermometer is mounted on the specimen holder. Its surface is in the same relative position with the specimen and subjected to the same test.

A.2.2.2 Exposure devices are placed in a heat-insulated box to reduce any effects of room temperature changes. The ventilation system provides a steady flow of air through the test chamber and the specimen. The temperature of the air is automatically controlled by mixing the warm air in the recirculation chamber with the cold air outside the chamber. In order to achieve the specified black standard temperature or blackboard temperature and to maintain the required dry bulb temperature constant, it can adjust and control the fan speed as necessary.

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