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NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

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GB/T 1720-2020

Replacing GB/T 1720-1979

Circle-drawing test of coating films

漆膜划圈试验

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Foreword

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

This Standard replaces GB/T 1720-1979, "Method of test for adhesion of paint films". Compared with GB/T 1720-1979, the main technical changes, except editorial changes, are as follows:

- Change the standard name to "Circle-drawing test of coating films";
- Add Scope, Normative references, Principle, Sample, Test panel, Test report (see Chapter 1, Chapter 2, Chapter 3, Chapter 5, Chapter 6, and Chapter 9);
- Modify requirements for the equipment (see 4.1; Chapter 1 of version 1979);
- Add the schematic diagram of the circle-drawing tester of electric coating films and the dimension figure of the rotating needle (see Figure 2, Figure 3);
- Add regulations for the rotating needle (see 4.2);
- Modify the test procedures (see Chapter 7, Chapter 2 of version 1979);
- Modify requirements for the test panel (see Chapter 6; Chapter 1 of version 1979);
- Modify the expression of results (see Chapter 8; Chapter 3 of version 1979);

This Standard was proposed by China Petroleum and Chemical Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee 5 on Paints & Pigments of Standardization Administration of China (SAC/TC 5).

The drafting organizations of this Standard: Heilongjiang Institute of Quality Supervision and Inspection, Biuged Laboratory Instruments (Guangzhou) Co., Ltd., Guangzhou Research Institute of Synthetic Materials, Avic Biam New Materials Technology Engineering Co., Ltd., Zhejiang Yu Tong New Materials Co., Ltd., Qingdao Air++ New Materials Co., Ltd., Shenzhen Grandland High-tech New Material Co., Ltd., CNOOC Changzhou Paint and Coatings Industry Research Institute Co., Ltd., Qingdao Xingguo Paint Co., Ltd., Ningbo Xin'an Dope Co., Ltd., Dongguan Taiho Paint Products Co., Ltd., China Academy of Building Research, Pushen Testing Instruments (Shanghai) Co., Ltd., Jiangnan

Circle-drawing test of coating films

1 Scope

This Standard specifies a test method to evaluate the peeling degree of the coating film from the substrate, when the overlapping cycloid diagram penetrates the coating film to the substrate.

This Standard applies to the determination of circle-drawing test of a single flat coating film on a hard substrate.

The performance that is measured by this experimental test method not only depends on the adhesion of the coating to the substrate, but also on various other factors; so, this test method cannot be regarded as a method for measuring adhesion.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 3186, Paints, varnishes and raw materials for paints and varnishes - Sampling

GB/T 9271, Paints and varnishes standard panels for testing

GB/T 9278, Temperatures and humidity for conditioning and testing of paint specimens

GB/T 13452.2, Paints and varnishes - Determination of film thickness

GB/T 20777, Paints and varnishes - Examination and preparation of samples for testing

GB/T 37356, Paints and varnishes - Lighting and procedure for visual assessments of coatings

3 Principle

Fix the test panel on a test-bed that can be moved forward and backward; while moving the test-bed, the rotating needle in a circular motion penetrates the

7 Test procedure

7.1 Test number of times

Perform three tests in parallel.

7.2 Test environment

Unless otherwise agreed, the test shall be performed under the conditions that are specified in GB/T 9278.

7.3 Inspection of circle-drawing diameter

7.3.1 Check the rotating needle tip (4.2); if it is not sharp, replace it.

7.3.2 Install an uncoated tinplate on the test-bed; draw circles according to normal operation; use a vernier caliper to measure the diameter of the circle, which shall be (10.5 ± 0.1) mm. When it does not match, adjust it in time. The user is recommended to regularly check the circle-drawing diameter according to the usage of the instrument.

7.4 Test

7.4.1 Check the sharpness of the rotating needle tip according to 7.3.1. It is recommended to replace the rotating needle regularly according to the usage frequency that is recommended by the supplier.

7.4.2 Fix the test panel on the test-bed with the coated surface facing up, so that the tip of the rotating needle touches the coating film. If the substrate is not exposed due to scratches, add weights from small to large.

7.4.3 Shake the handle evenly in a clockwise direction; control the speed within the range of 80 r/min ~ 100 r/min. If an electric circle-drawing tester of coating films is used, the rotation speed is usually set to 80 r/min.

7.4.4 When the drawn cycloid scratch reaches the standard drawing length (7.5 ± 0.5) cm, stop the test; take out the test panel; use the soft brush (4.4) to remove the paint chips on the scratch.

7.4.5 Observe the upper side of the scratch under natural or artificial sunlight as specified in GB/T 37356; use a 4x magnifier (4.3) to observe if necessary.

8 Expression of results

Mark seven positions, namely 1, 2, 3, 4, 5, 6, and 7, in turn on the upper side of the cycloid scratch, which are divided into 7 grades, where grade 1 is the

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