

Translated English of Chinese Standard: GB/T9286-1998

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# GB

## NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 87.040

G 50

### GB/T 9286-1998

Replacing GB/T 9286-88

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## Paints and varnishes -- Cross cut test for films

色漆和清漆 漆膜的划格试验

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## Foreword

This Standard is the revision of GB/T 9286-88 *Paints and varnishes -- Cross cut test for films* as per the international standard ISO 2409:1992 *Paints and varnishes -- Cross-cut test* (second edition).

This standard is equivalent to ISO 2409:1992, and the differences are as follows:

- MODIFY the ISO 1512:1991 *Paints and varnishes -- Sampling of products in liquid or paste form*, and ISO 1513:1992 *Paints and varnishes -- Examination and preparation of samples for testing* in the normative references to GB 3186-82(89) *Sampling paint products* (with reference to ISO 1512:1991 and ISO 1513:1992).
- MODIFY the ISO 1514:1984 *Paints and varnishes -- Standard panels for testing* in the normative references to GB/T 9271-88 *Paints and varnishes -- Standard panels for testing* (equivalent to ISO 1514:1984).
- MODIFY the ISO 2808:1991 *Paints and varnishes -- Determination of film thickness* in the normative references to GB/T 13452.2-92 *Paints and varnishes -- Determination of film thickness* (equivalent to ISO 2808:1974).
- MODIFY the ISO 3270:1984 *Paints and varnishes and their raw materials -- Temperatures and humidities for conditioning and testing* in the normative references to GB 9278-88 *Temperatures and humidities for conditioning and testing of paint specimens* (equivalent to ISO 3270:1984).
- According to the national conditions, IEC 454-2:1974 *Specifications for pressure-sensitive adhesive tapes for electrical purposes -- Part 2: Methods of test* is not referenced in this Standard.
- According to the national conditions, the agreed adhesive tape has been added.
- ADD GB/T 1727-92 *General preparation of paint film* to the normative references.

This Standard has made partial changes to the technical content of the previous edition of GB/T 9286-88 and made comprehensive editorial changes.

The main technical differences between this edition and the previous edition are as follows:

- The spacing of the cuts is prescribed, depending on the thickness of the coating and the type of substrate, which is not prescribed in the previous

edition.

- The methods for applying adhesive tapes to hard substrates and the requirements for adhesive tapes have been added.
- The number of cuts of 11 has been cancelled. The number of cuts prescribed in the previous edition is 6 or 11.
- Operating procedures are prescribed in manual cutting, while specific operations are no longer prescribed in mechanical cutting, which is subject to the requirements of manual cutting operations. The previous edition specifies the detailed operating procedures for mechanical cutting.
- The schematic diagram of the instrument for mechanical cutting has been removed.

This Standard replaces GB/T 9286-88 from the date of implementation.

Annex A of this Standard is a normative annex.

This Standard was proposed by the Ministry of Chemical Industry of the People's Republic of China.

This Standard shall be under the jurisdiction of National Technical Committee for Standardization of Paints and Pigments.

Drafting organization of this Standard: Changzhou Paint and Coatings Industry Research Institute of the Ministry of Chemical Industry.

Drafter of this Standard: Ji Xiaoman.

This Standard was first published on April 19, 1988.

## Paints and varnishes -- Cross cut test for films

### 1 Scope

**1.1** This Standard specifies a test method for assessing the resistance of paint coatings to separation from substrates when a right-angle lattice pattern is cut into the coating, penetrating through to the substrate. The property measured by this empirical test procedure depends, among other factors, on the adhesion of the coating to either the preceding coat or the substrate. This procedure is not to be regarded, however, as a means of measuring adhesion.

NOTE 1: Although the test is primarily intended for use in the laboratory, the test is also suitable for field testing.

**1.2** The method described may be applied either as a pass/fail test or, where circumstances are appropriate, as a six-step classification test (SEE 8.3). When applied to a multi-coat system, assessment of the resistance to separation of individual layers of the coating from each other may be made.

**1.3** The test may be carried out on finished objects and/or on specially prepared test specimens.

Although the method is applicable to paint on hard (steel) and soft (wood and plaster) substrates, these different substrates need a different test procedure (SEE clause 7).

The method is not suitable for coatings of total thickness greater than 250µm or for textured coatings.

NOTE 2: The method, when applied to coatings designed to give a rough patterned surface, will give results which will show too much variation.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

GB/T 1727-92 *General preparation of paint film* <sup>1</sup>

GB 3186-82(89) *Sampling paint products* <sup>2</sup> (neq ISO 1512:1978, etc.)

GB/T 9271-88 *Paints and varnishes -- Standard panels for testing* <sup>3</sup> (eqv ISO 1514:1984)

GB 9278-88 *Temperatures and humidities for conditioning and testing of paint specimens* <sup>4</sup> (eqv ISO 3270:1984)

GB/T 13452.2-92 *Paints and varnishes -- Determination of film thickness* <sup>5</sup> (eqv ISO 2808:1974)

### 3 Required supplementary information

For any particular application, the test method specified in this Standard needs to be completed by supplementary information. The items of supplementary information are given in Annex A.

## 4 Apparatus

### 4.1 Cutting tool

It is particularly important to ensure that the cutting tool has a defined shape and that the cutting edges are in good condition.

**4.1.1** Suitable cutting tools are listed below and shown in Figures 1 a) and 1 b):

- a) single-blade cutting tool with 20° to 30° edge and other dimensions, as specified in Figure 1 a);
- b) multi-blade cutting tool with six cutting edges spaced 1mm or 2mm apart, as specified in Figure 1 b).

The single-blade cutting tool is the preferred tool in all cases, i.e., with all kinds of coating on both hard and soft substrates. The multi-blade cutting tool is not suitable for thick (>120µm) or hard coatings or where the coating is applied over soft substrates.

**4.1.2** The tools specified in 4.1.1 are suitable for manual use and, although this is the more usual method of use, the tool may be mounted on a motor-

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Adoption description:

<sup>1</sup> This corresponding standard is not referenced in ISO 2409:1992.

<sup>2</sup> ISO 1512:1991 and ISO 1513:1992 are referenced in ISO 2409:1992.

<sup>3</sup> ISO 1514:1984 is referenced in ISO 2409:1992.

<sup>4</sup> ISO 3270:1984 is referenced in ISO 2409:1992.

<sup>5</sup> ISO 2808:1991 is referenced in ISO 2409:1992.

0 to 60µm: 1mm spacing for hard substrates.

0 to 60µm: 2mm spacing for soft substrates.

61 to 120µm: 2mm spacing for hard or soft substrates.

121 to 250µm: 3mm spacing for hard or soft substrates.

## **7.2 Cutting and removing the coating using the manual procedure**

**7.2.1** PLACE the test panel on a rigid, flat surface to prevent any deformation of the panel during the test.

**7.2.2** PERFORM the cutting manually following the specified procedure.

Before the test, INSPECT the cutting edge of the blade and MAINTAIN its condition by sharpening or replacement.

If the panel is of wood or similar material, MAKE the cuts at approximately 45° to the direction of the grain.

**7.2.3** HOLD the cutting tool (4.1) with the blade normal to the test panel surface. With uniform pressure on the cutting tool and using the appropriate spacing guide (4.2), MAKE the agreed number of cuts in the coating at a uniform cutting rate. All the cuts shall penetrate to the substrate surface.

If it is not possible, due to the hardness of the coating, to penetrate to the substrate, the test shall be declared invalid and so reported.

**7.2.4** REPEAT this operation, making further parallel cuts of equal number, crossing the original cuts at 90° to them so that a lattice pattern is formed.

**7.2.5** BRUSH the panel lightly with the soft brush (4.3) several times backwards and several times forwards along each of the diagonals of the lattice pattern.

**7.2.6** For hard substrates only, APPLY additionally adhesive tape (4.4). PULL out a piece of adhesive tape at a uniform speed. REMOVE the frontmost section. Then CUT a piece approximately 75mm long.

PLACE the center of the tape over the lattice in a direction parallel to one set of cuts, as shown in Figure 3. SMOOTH the tape into place over the area of the lattice and for a distance of at least 20mm beyond with a finger.

To ensure good contact with the coating, RUB the tape firmly with a fingertip. The color of the coating seen through the tape is a useful indication of overall contact.

Within 5min of applying the tape, REMOVE the tape by grasping the free end

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