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

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**Measurement of peel adhesion properties for adhesive tapes
(English Translation)**

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1 Scope

This Standard specifies a series of test methods for the peel strength of adhesive tapes.

This Standard is applicable to the determination of peel strength of adhesive tapes, and is also used for controlling the quality of adhesive tapes.

2 Normative references

The following documents are essential to the application of this document. For dated references, only the editions with the dates indicated are applicable to this document. For undated references, only the latest editions (including all the amendments) are applicable to this document.

GB/T 2523-2008 Measuring method of surface roughness and peak count for cold-rolled metal sheet (strip)

GB/T 3280-2007 Cold-rolled stainless steel plate, sheet and strip

GB/T 22396 Terminology relating to pressure sensitive adhesive products

3 Terms and definitions

The terms and definitions defined in GB/T 22396 and the following ones are applicable to this document.

3.1 Peel strength

It refers to the force required to peel a unit width of adhesive tape from a specific adhesive surface at a specified angle and speed, in unit of N/cm.

3.2 Test assembly

It refers to the assembly formed by pasting the adhesive tape to be tested behind the steel plate.

3.3 Roughness average

- methanol;
- methyl ethyl ketone;
- acetone;
- n-heptanone;
- a mixture of n-heptane and a fluorinated hydrocarbon, such as refrigerant (suitable when toxicity or flammability restrictions apply).

Solvents shall be of general purpose chemical grade and held in a suitable vessel.

5.3.1 Test piece cutter

An appropriate test piece cutter shall hold two single edge razor blades in parallel planes a precise distance apart, to form a cutter of exact specimen width; two cutters, 12mm and 24mm cutting widths, shall be available or appropriate alternatives which will not cause edge damage. The precision of the razor blade separation shall be the nominal width ± 0.1 mm.

5.3.2 Testing machine

A constant rate of extension (CRE) tension tester shall be used. It is proposed to use an automatic recorder taking at least one reading per mm of the adhesive tape peeled. The tester shall have two clamps calibrated to the same centerline, parallel with the direction of the motion on the same plane and so aligned that they will clamp the specimen wholly. MOVE at a uniform rate of (5.0 ± 0.2) mm/s.

RECORD the load reading. The maximum permissible error shall be 2%.

5.3.3 Stainless steel plates

The surfaces of the stainless steel plates shall be perfectly flat, at least 125mm long, 50mm wide and 1.1mm thick. Stainless steel types shall comply with the

06Cr19Ni10 material specified in GB/T 3280-2007. The stainless steel plates (hereinafter referred to as "steel plates") shall have a bright annealed finish with a surface roughness (GB/T 2523-2008) of (50 ± 25) nm.

The steel plates showing stains, discoloration or many scratches are not acceptable. The

steel plates shall be cleaned prior to use as described in

Section 5.5.2. The steel plate test surface shall be protected from scratches and contamination during use, and shall be stored according to the conditions described in Section 5.4.1.

The standard test conditions are as follows: the ambient temperature shall be $(23 \pm 1) ^\circ\text{C}$; the relative humidity shall be $(50 \pm 5) \%$.

5.5.2 Preprocessing of the steel plates

5.5.2.1

USE one of the solvents described in Section 5.2.2 to clean the steel plates. USE fresh absorbent cleaning material to wipe the steel plates to dryness. REPEAT for a total of three washes with the same solvent. USE methyl ethyl ketone or acetone for cleaning during the final wipe.

5.5.2.2 After washing, DRY the steel plates for at least 10min. The testing

steel plates that have not been used within 10h need to be cleaned again. In order to obtain consistent results, USE methyl ethyl ketone or acetone to clean new steel plates for at least 10 times before use.

Note: DISCARD the steel plates with stains, discoloration or many scratches. AVOID contacting the surfaces of the steel plates with fingers. During storage, the steel plates shall be protected from damage or contamination.

5.5.3.1 Sample preparation

As described in Section 5.4.4, CUT a 300mm long test piece from the adhesive tape to be tested. FOLD 12mm at one end, adhesive surface to adhesive surface to form a tab. TOUCH the other end of the test piece to an end of the steel plate. HOLD the tabbed end of the test piece so that it does not make contact with the steel plate, but is positioned loosely above it. ROLL mechanically or by hand twice in each lengthwise direction, so as to prevent entrapment of air between adhesive surface and steel plate. Should this occur,

DISCARD the test piece, and MAKE preparation again.

Individually PREPARE each test piece. TEST within 1min.

Note: Peel strength increases with the dwell time of various adhesive tapes. If it is necessary to select longer dwell time, MAKE further indications.

5.5.3.2 Peel strength test

PEEL 25mm of the adhesive tape from the steel plate at the folded end of the adhesive tape. CLAMP one end of the steel plate into one of the jaws of the tensile testing machine. CLAMP the free end of the adhesive tape into the other jaw. CONDUCT continuous peeling at the rate of (5.0 ± 0.2) mm/s.

After the load jaw is in operation, DISREGARD the values obtained while the first 25mm of the adhesive tape is mechanically peeled. USE the average force preparation again. Individually PREPARE each test piece and DETERMINE the peel strength within 1min.

6.4.2.2 The peel strength test is same as Section 5.5.3.2.

6.5 Test results

As Section 5.6.

6.6 Test report

As Section 5.7.

7 Method 3: Test method of peel strength for double-

sided and transfer adhesive tapes from stainless steel at an angle of 180°

7.1 Principle

The method 3 specifies the test method of the force required to peel the double- sided or transfer adhesive tape from the surface of the stainless steel plate being covered by a 25µm polyester film.

APPLY a length of double-sided or transfer adhesive tape to a steel plate. FIX the steel plate on one clamp of a tensile testing machine. USE the other clamp of the testing machine to clamp the free end of the adhesive tape. Continuously

PEEL the clamp from the free end at an angle of 180°. MEASURE the force required to peel the double-sided or transfer adhesive tape continuously from the steel plate. CONVERT to the peel strength afterwards. PAY attention that the line of separation shall be perpendicular to the direction of the applied force.

7.2 Materials

As Section 5.2.

- Polyester film with a thickness of 25µm, which is approximately 3mm wider than the test piece to be tested (the polyester film is typically 27mm wide).