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**Gummed tape—Testing methods
for adhesive strength**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by the Japan Packaging Institute (JPI)/the Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS Z 0218 : 1997** is replaced with this Standard.

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In the event of any doubts arising as to the contents,
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Gummed tape— Testing methods for adhesive strength

1 Scope This Japanese Industrial Standard specifies testing methods for initial tackiness and adhesive strength of paper gummed tape, cloth gummed tape and the like.

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS P 3902 *Linerboards*

JIS P 8110 *Paper and board—Sampling to determine average quality*

JIS P 8119 *Paper and board—Determination of smoothness by Bekk method*

JIS P 8122 *Testing method for Stöckigt sizing degree of paper*

JIS R 3202 *Float glass and polished plate glass*

JIS Z 0203 *Packaged freights—Conditioning for testing*

JIS Z 8401 *Guide to the rounding of numbers*

3 Definitions For the purposes of this Standard, the following definitions apply.

- a) **initial tackiness** The adhesive property of gummed tape in a not-get-dry state, when moistened with water at adhesive surface and then immediately applied on ground paper for testing.
- b) **adhesive strength** The peeling resistance of gummed tape after applied to ground paper for testing and naturally dried up similarly to practical use. In this Standard, this is expressed by degree of damage on an adhered surface.
- c) **open time** The time required from moistening the test piece with water to adhering it on ground paper for testing.

4 General conditions of test

4.1 Temperature and humidity conditions of laboratory Temperature and humidity conditions of a laboratory shall be 23 ± 2 °C in temperature and (50 ± 5) % in relative humidity in accordance with temperature and humidity conditions G in Table 1 of JIS Z 0203. If special preconditioning under other condition is required, the test may be carried out on the basis of the agreement between the parties concerned and it shall be described on the report.

4.2 Preparation of test piece and conditions of test Cut the test piece of specified width and length, along accurately transverse and longitudinal directions of the paper from the sample preconditioned for not less than 12 h under the conditions of 4.1. The dimensions of a test piece are given in the specifications of respective testing methods. When the test piece cannot be cut at specified size due to the narrow width of the tape, it may be taken from coated base paper before cutting.

If necessary, by the agreement between the parties concerned, the test piece may be sampled directly from the winding of product, and immediately submitted to the test without preconditioning. In this case, the effect of omitting of preconditioning shall be appended in the record of test results.

4.3 Ground paper for testing Use the paper preconditioned for not less than 12 h under the condition of 4.1.

4.4 Humidifier and quantity of water for humidifying A humidifier shall be the machine that moistens uniformly all over the coated surface of a test piece. Quantity of water for humidifying shall be $20 \pm 5 \text{ g/m}^2$, for which distilled water or tap water at approximately 20 °C shall be used.

4.5 Open time The open time for this test shall be in a range from 0 s to 10 s.

5 Sampling Sampling shall be in accordance with **JIS P 8110**. The number of test pieces is 10 for each test.

Test pieces shall be taken from inside layer of winding after the outside four layers are discarded.

6 Testing methods for initial tackiness Any one of the following methods shall be adopted for the test to evaluate the initial tackiness of gummed tape.

- a) **Initial tackiness test method A** Testing by means of Maclaurin's tester
- b) **Initial tackiness test method B** 180° peeling test
- c) **Initial tackiness test method C** 90° peeling test

6.1 Initial tackiness test method A

6.1.1 Apparatus The tester shall be the Maclaurin's tester having the elements and structure stated below (refer to Fig. 1).

- a) Two platens contacting at the center of the tester and being kept horizontally before operating. They rise up turning around the pivots positioned at their bottom surfaces and their centers of gravity coincide with the respective pivots (refer to Informative Fig. 1).
- b) Two devices, being attached at both right and left ends of platens, which can fix ground paper at each specified position. The position for fixing the ground paper is approximately 50 mm apart from the center line, and shall be parallel to the center line.
- c) A pendulum shall be attached for measuring the resistance resulted from the tackiness of gummed tape.

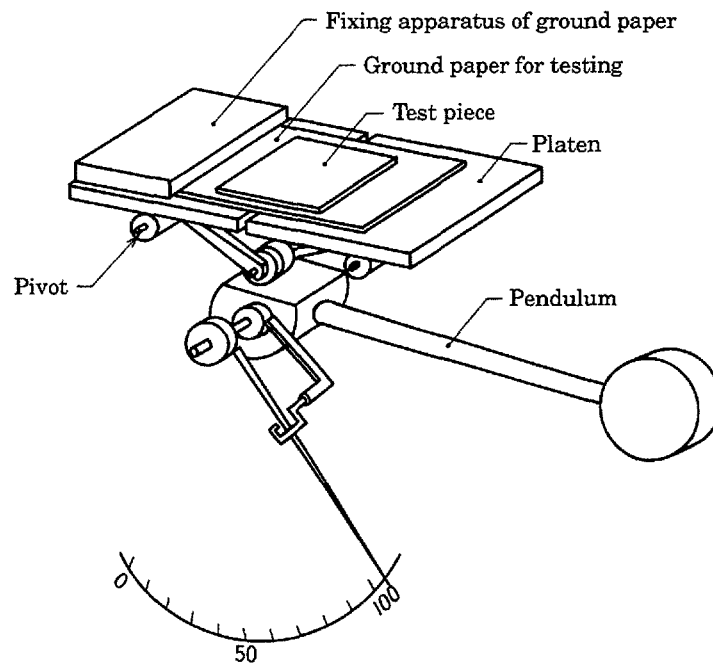
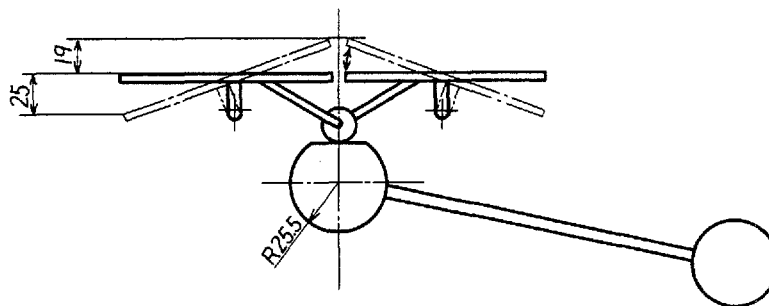


Fig. 1 Maclaurin's tester

Unit : mm



Informative Fig. 1 Conceptual figure of mechanism

The work load of the pendulum shall be 2.5 N • m.

The shaft of the pendulum is equipped with a cam by which the contacting parts of two platens are pushed up with the swing of the pendulum.

- d) The stay put (non-automatic return) pointer shall be furnished so as to show the angle of distortion of the pendulum. The pointer shall indicate zero when no resistance of the adhesive force is present, and shall indicate 100 when the adhering resistance given by gummed tape is maximum. The scale is graduated equally, and the graduation is shown by points.
- e) The ground paper for testing, which is clamped by the fixing devices on right and left sides, is cut along the center line where two platens contact each other.
- f) A device which moistens the test piece (gummed tape) with water, pastes it on ground paper within the specified time interval, and applies a constant pressure on it shall be provided. The roller for pressurizing the test piece on the ground paper shall be made of iron, shall have approximately 110 mm in width

and a total mass of approximately 7.5 kg, and its periphery is wrapped with spongy rubber (approximately 6 mm in thickness). The adhesion test is carried out by back-and-forth pressurizing of the roller, and the speed of traveling shall be capable of being controlled at approximately 250 mm/s.

6.1.2 Test piece From the sample preconditioned according to 4.2, take a test piece of 50 mm in width and 140 mm in length.

6.1.3 Ground paper for testing The material shall be base paper for gummed tape, and comply with the requirement given in Table 1. Precondition it as shown in 4.3.

Table 1 Ground paper for testing (for initial tackiness test method A)

Testing items	Maximum	Minimum	Remarks
Basis weight g/m ²	102.5	97.5	—
Thickness mm/100	17	14	—
Smoothness s	—	10	By Bekk tester ⁽¹⁾
Sizing s	—	32	By Stöckigt method ⁽²⁾
Dimensions mm	Width 220 × Length 160	—	—

Notes (1) Refer to **JIS P 8119**.

(2) Refer to **JIS P 8122**.

Remarks : Cutting of ground paper for testing shall be made so that its longitudinal direction is parallel to the machine direction of paper.

6.1.4 Procedure The procedure shall be as follows.

- a) A tester is confirmed to be set horizontally.
- b) When the tester works without load, the reading of the pointer is zero. Place the ground paper for testing so that the center line of the ground paper (middle of width) falls on between the right and left platens, and fix rigidly its right and left ends correctly with the clamps. Cut the ground paper along the gap between two platens using a cutter. After moistening uniformly the test piece with prescribed quantity of water, immediately apply it softly to the ground paper along the cut line. Then, by using a roller for testing, pressurize the test piece back-and-forth at a speed of approximately 250 mm/s, and immediately push up the two platens by approximately 7° turning on the shaft of pivot, by making the pendulum of the tester swing. Read the work load given to the test piece by the pendulum from the indicator dial shown by the stay put pointer. In the test of initial tackiness, it is preferable to finish this test procedure within 5 s because the results are seriously influenced by the interval from humidifying through pressurizing to pushing up.

6.2 Initial tackiness test method B

6.2.1 Apparatus This is an apparatus corresponding to the constant-speed tensile tester, in which two grips are positioned so that their centers lie on a plane parallel to the tensile direction. The test piece shall not slide and shall be kept on the same plane while testing. The distance between two grips shall be 180 ± 10 mm.

- a) **Weight for pressurizing** A 2 kg-weight having an oblong bottom of 60 mm $\times$ 90 mm shall be used.
- b) **Flat and smooth metal plate for placing ground paper for testing** The size shall be approximately 150 mm $\times$ 200 mm.

6.2.2 Test piece Follow 6.1.2, provided that dimensions are 15 mm in width and 300 mm in length.

6.2.3 Ground paper for testing The material shall be the raw paper of 100 % bleached kraft paper which complies with Table 2, and the paper shall be conditioned as shown in 4.3, then cut into a piece of 18 mm in width and 150 mm in length.

Table 2 Ground paper for testing (for initial tackiness test methods B and C)

Testing items	Maximum	Minimum	Remarks
Basis weight g/m ²	169	153	—
Thickness mm/100	18.8	16.8	—
Smoothness s	—	30	By Bekk tester ⁽¹⁾
Sizing s	—	100	By Stöckigt method ⁽²⁾

Remarks : Cutting of ground paper for testing shall be made so that its longitudinal direction is parallel to the machine direction of paper.

6.2.4 Procedure The procedure shall be as follows.

- a) Apply the test piece moistened uniformly with prescribed quantity of water to the center of ground paper for testing, and pressurize it with a weight for 5 s (refer to Figs. 2 and 3).
- b) After pressurization, fold back the free end of the test piece by an angle of 180°, and fasten the end of the test piece to the lower grip and the ground paper to the upper grip.
- c) Ten seconds later from fastening the test piece, make the pendulum swing freely by lifting up the claw, and peel the test piece continuously at a speed of 300 ± 20 mm/min.