



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS Z 0237 : 2022

(JATMA/JSA)

**Testing methods of pressure-sensitive
adhesive tapes and sheets**

ICS 83.180

Reference number : JIS Z 0237 : 2022 (E)

PROTECTED BY COPYRIGHT

Date of Establishment: 1980-03-01

Date of Revision: 2022-01-20

Date of Public Notice in Official Gazette: 2022-01-20

Investigated by: Japanese Industrial Standards Committee
Standards Board for ISO area

JIS Z 0237 : 2022, First English edition published in 2023-01

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2023

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

HT/HN

PROTECTED BY COPYRIGHT

Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 General test conditions	2
4.1 Conditioning and preparation of test specimen	2
4.2 Expression of test results	3
4.3 Acceleration procedure	3
4.4 Determination of change rate	3
5 Thickness measurement	4
5.1 Measuring apparatus	4
5.2 Measuring method	4
5.3 Results	4
6 Width measurement	5
6.1 Measuring apparatus	5
6.2 Measuring method	5
6.3 Results	5
7 Length measurement	5
7.1 Measuring apparatus	5
7.2 Measuring method	5
7.3 Results	5
8 Breaking strength and elongation at break	5
8.1 Test specimen	5
8.2 Testing apparatus	6
8.3 Test method	6
8.4 Results	7
8.5 Test report	8
9 Tearing strength	8
9.1 Test specimen	8
9.2 Testing apparatus	8
9.3 Test method	8
9.4 Results	8
9.5 Test report	9
10 Adhesion	9
10.1 Test specimen	9

10.2	Testing apparatus and test panels	9
10.3	Test method	11
10.4	Peel adhesion measurement	14
10.5	Results	16
10.6	Test report	16
11	Low speed unwinding force	17
11.1	Sample	17
11.2	Testing apparatus	17
11.3	Test method	17
11.4	Results	17
11.5	Test report	17
12	High speed unwinding force	18
12.1	Sample	18
12.2	Testing apparatus	18
12.3	Test method	18
12.4	Results	18
12.5	Test report	18
13	Static shear adhesion	19
13.1	Test specimen	19
13.2	Testing apparatus	19
13.3	Test method	20
13.4	Results	21
13.5	Test report	21
14	Rolling ball tack	21
14.1	Test specimen	21
14.2	Testing apparatus	21
14.3	Test method	22
14.4	Results	23
14.5	Test report	23
15	Water vapour permeability	23
15.1	Test method	23
15.2	Results	24
15.3	Test report	24
Annex JA (normative)	Procedures for accelerated weathering and accelerated light exposure	25
Annex JB (normative)	Procedure for accelerated storage	27
Annex JC (informative)	Comparison table between JIS and corresponding International Standards	29

Foreword

This Japanese Industrial Standard has been 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 Japan Adhesive Tape Manufacturers Association (JATMA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act.

This edition replaces the previous edition (**JIS Z 0237** : 2009), which has been technically revised.

This **JIS** document is protected by the Copyright Act.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, published patent application or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, published patent application or utility model rights.

Blank

Testing methods of pressure-sensitive adhesive tapes and sheets

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 29862** : 2018 (Edition 2), **ISO 29863** : 2018 (Edition 2) and **ISO 29864** : 2018 (Edition 2) with some modifications of the technical contents.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JC.

1 Scope

This Standard specifies the testing methods for pressure-sensitive adhesive tapes and sheets (hereafter referred to as tapes and sheets) used for packages, seals, indicators or the like.

NOTE The International Standards corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 29862 : 2018 *Self adhesive tapes — Determination of peel adhesion properties*

ISO 29863 : 2018 *Self adhesive tapes — Measurement of static shear adhesion*

ISO 29864 : 2018 *Self adhesive tapes — Measurement of breaking strength and elongation at break* (Overall evaluation : MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

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

JIS B 0601 *Geometrical Product Specifications (GPS) — Surface texture : Profile method — Terms, definitions and surface texture parameters*

JIS B 1501 *Rolling bearings — Balls*

JIS B 7503 *Mechanical dial gauges*

JIS B 7507 *Vernier, dial and digital callipers*

JIS B 7512 *Steel tape measures*

- JIS B 7516 *Metal rules*
- JIS B 7721 *Tension/compression testing machines — Calibration and verification of the force-measuring system*
- JIS B 7751 *Light-exposure and light-and-water-exposure apparatus (Enclosed carbon-arc type)*
- JIS B 7753 *Light-exposure and light-and-water-exposure apparatus (Open-flame carbon-arc type)*
- JIS B 7754 *Light-exposure and light-and-water-exposure apparatus (xenon-arc lamp type)*
- JIS C 2318 *Balanced biaxially oriented polyethylene terephthalate films used for electrical purposes*
- JIS G 4305 *Cold-rolled stainless steel plate, sheet and strip*
- JIS G 4805 *High carbon chromium bearing steels*
- JIS K 6253-3 *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 3 : Durometer method*
- JIS P 8116 *Paper — Determination of tearing resistance — Elmendorf tearing tester method*
- JIS Z 0109 *Glossary of terms used in pressure sensitive adhesive tapes and sheets*
- JIS Z 0208 *Testing Methods for Determination of the Water Vapour Transmission Rate of Moisture-Proof Packaging Materials (Dish method)*
- JIS Z 1524 *Pressure sensitive adhesive cloth tapes for packaging*
- JIS Z 8703 *Standard atmospheric conditions for testing*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS Z 0109** apply.

4 General test conditions

4.1 Conditioning and preparation of test specimen

Unless otherwise specified, condition the sample in a standard atmosphere at a temperature of $23\text{ °C} \pm 1\text{ °C}$ and the relative humidity of $(50 \pm 5)\%$ for at least 24 h. If these tolerances cannot be maintained, the closest possible tolerances shall be used and these revised tolerances quoted in the report. When the sample is tested in rolls, insert a release liner between the sample rolls so that, when stacked, the side faces of the adjacent rolls do not stick together. The conditioning period may be 2 h or longer if the sample is brought from an atmosphere of normal temperature and normal humidity specified in **JIS Z 8703**.

Discard at least three outer wraps of tape from the sample roll, and unless otherwise

specified, unwind gently with care to avoid distortion of the adhesive face, and then take the necessary number of test specimens of the required dimensions for the specific test purpose. Obtained test specimen shall be handled with care not to allow anything to be in contact with their adhesive face.

4.2 Expression of test results

The test result obtained by each test shall be rounded off and reported to the number of digits specified in Table 1.

Table 1 Reporting of test results

Test item		Reported to
Thickness mm	0.1 mm or under	three decimal places
	over 0.1 mm	two decimal places
Width mm	150 mm or under	one decimal place
	over 150 mm	a whole number
Length m		one decimal place
Breaking strength N/10 mm		one decimal place
Elongation at break %		a whole number
Tearing strength (pendulum tearing method) N		two decimal places
Adhesion N/10 mm		two decimal places
Low speed unwinding force N/10 mm		two significant digits
High speed unwinding force N/10 mm		two significant digits
Static shear adhesion	Slippage mm	one decimal place
	Time to failure min	a whole number
Rolling ball tack		a whole number
Water vapour permeability (g/m ² ·24 h)		a whole number

4.3 Acceleration procedure

In any performance test that tests the product's weathering resistance, light resistance and storage stability regarding the life of the product, the product shall first be subjected to the accelerated weathering and light exposure procedures specified in Annex JA and the accelerated storage procedure specified in Annex JB before test pieces are taken from it and subjected to the adhesion test, static shear adhesion test, etc. The acceleration procedures are designed to assess the change in performance of the product under the prescribed conditions.

4.4 Determination of change rate

The change in performance before and after exposure to the acceleration procedure shall be determined according to the equation of the change rate shown below:

$$V = \frac{A_1 - A_0}{A_0} \times 100$$

where, V : change rate (%)
 A₀ : value before exposure

A_1 : value after exposure

5 Thickness measurement

5.1 Measuring apparatus

5.1.1 General

For the measurement of thickness, Measuring apparatus A or Measuring apparatus B having a plane contact face 5 mm to 16 mm in diameter shall be used.

5.1.2 Measuring apparatus A

A constant load calliper gauge (see Figure 1) with a measuring pressure of 40 kPa to 60 kPa.

5.1.3 Measuring apparatus B

A spring dial gauge specified in **JIS B 7503** or any dial gauge equivalent thereto in precision (see Figure 2) with a measuring pressure of 20 kPa to 60 kPa.



Figure 1 Measuring apparatus A



Figure 2 Measuring apparatus B

5.2 Measuring method

Take a test specimen of approximately 1 m in length, and measure the thickness at three positions at approximately equal intervals in lengthwise direction by using Measuring apparatus A or Measuring apparatus B with 0.01 mm or larger scale specified in 5.1 for tapes and sheets of over 0.1 mm in thickness, and by using Measuring apparatus A or Measuring apparatus B with 0.001 mm scale for tapes and sheets of 0.1 mm or under in thickness.

In the case of tapes and sheets of over 100 mm in width, measure the thickness at three positions in widthwise direction and at three positions in lengthwise direction.

5.3 Results

Record the results as the average value, in millimetres (mm), of measurements taken at respective measuring points.

6 Width measurement

6.1 Measuring apparatus

For the measurement of width, the vernier calliper of 0.05 mm in minimum reading specified in **JIS B 7507**, the steel tape measure specified in **JIS B 7512** or the metal rule specified in **JIS B 7516** shall be used.

6.2 Measuring method

Take a test specimen of approximately 300 mm in length, and measure the width at three positions at approximately equal intervals in lengthwise direction by using the measuring apparatus specified in **6.1**. When measuring in a rolled state, measure the width at three positions at approximately equal intervals of 120° along the circumference.

6.3 Results

Record the results as the average value, in millimetres (mm), of measurements taken at respective measuring points.

7 Length measurement

7.1 Measuring apparatus

For the measurement of length, the steel tape measure specified in **JIS B 7512** or the metal rule specified in **JIS B 7516** shall be used.

7.2 Measuring method

Using the measuring apparatus specified in **7.1**, measure the length by unwinding the whole length with the adhesive face up if it is a tape, and measure the length of the sheet as it is if it is a sheet. Where the measurement by continuous unwinding of the total length of the tape is difficult, cut the tape to appropriate lengths, measure the length of each individual strip and calculate the total sum of all strips to report it as the total length.

7.3 Results

Record the measured values in metres (m).

8 Breaking strength and elongation at break

8.1 Test specimen

Cut test specimens from a sample tape or sheet so that they are 12 mm or 24 mm in width, or if the tape or sheet is 50 mm wide or less, so that they have the same width as the tape or sheet. In any case, the width of the test specimen shall not be 3 mm or smaller. In the case of taking from a rolled tape, the test specimens shall be removed radially from the roll at an approximate speed of 300 mm/s. When testing easily extensible self adhesive tapes such as those based on plasticised PVC, PE, etc. it is recommended that the test specimens be further conditioned for 2 h or longer to remove strain and distortion due to unrolling.

Five or more test specimens shall be prepared for each test. For Method A specified in 8.3.1, each test specimen shall be approximately 200 mm long, for Method B specified in 8.3.2, each test specimen shall be approximately 700 mm long.

8.2 Testing apparatus

8.2.1 General

The tension testing machine specified in **JIS B 7721** (Class 1 : relative indication error ± 1.0 %) or any tension testing machine equivalent to this in performance shall be used.

The capacity of the testing machine shall be such that a measured value is within the range of 15 % to 85 % of its capacity. The tension speed shall be $5 \text{ mm/s} \pm 0.2 \text{ mm/s}$, and the reading tolerance shall be 2 % or under. For the indication of the measured value, any one of an analogue method, a digital method, a digital recording method or a chart recording method may be used.

8.2.2 Testing apparatus A (Method A)

Testing apparatus A shall be used for testing other tapes than filament reinforced tapes, and shall have two clamps aligned on the straight line of motion. The clamps should preferably be of the pneumatic action type capable of providing an uninterrupted clamping force. Clamp faces shall be at least 50 mm wide and 38 mm deep and have a light cross-hatched serration to minimise the risk of slippage.

8.2.3 Testing apparatus B (Method B)

Testing apparatus B shall be used for testing filament reinforced tapes and shall consist of two cylinders in place of clamps in Method A. Each of the two cylinders shall be approximately 100 mm in diameter and approximately 38 mm wide and held in the position so that the cylinder surface falls on the tensile stress line of the tape. The cylinders shall be counterbalanced by means of a balance adjustment screw so that no side forces are exerted on the tape during the test. A paper scale approximately 22 mm in length divided into 2 mm increments shall be attached to the surface of each cylinder.

8.3 Test method

8.3.1 Method A

Set the clamps 100 mm apart or mark the test specimen with benchmarks that are 100 mm apart. Move the machine at $5 \text{ mm/s} \pm 0.2 \text{ mm/s}$ until the test specimen breaks, and measure the final load at break and the distance between chucks/benchmarks at break. Reject all test specimens which break within 5 mm of the clamps and carry out sufficient further tests to obtain five test specimens which break in the correct manner.

Calculate the breaking strength and elongation at break by the following formula :

$$T = \frac{10 \times P}{W}$$

where, T : breaking strength (N/10 mm)

P : final load at break (N)
 W : width of test specimen (mm)

$$E = \frac{L_1 - L_0}{L_0} \times 100$$

where, E : elongation at break (%)
 L_0 : initial distance between clamps or benchmarks (mm)
 L_1 : final distance between clamps or benchmarks (mm)

8.3.2 Method B

Set the cylinders 150 mm apart, and apply approximately 230 mm of the test specimen closely around the upper cylinder, and then wrap the remaining portion of the test specimen around the surface of the bottom cylinder removing any slack (see Figure 3) so that 250 mm of tape will extend between and without contact with the cylinders. Mark the test specimen and the cylinder, with a marking pen making a line approximately 1 mm wide, at the line where the tape contacts each cylinder.

Measure the breaking strength and elongation at break according to 8.3.1. Read the change in benchmark position at break to the nearest 2 mm using the 2 mm paper scale, subtract this from the distance between cylinders noted at break, and calculate the elongation at break (%) according to 8.3.1.

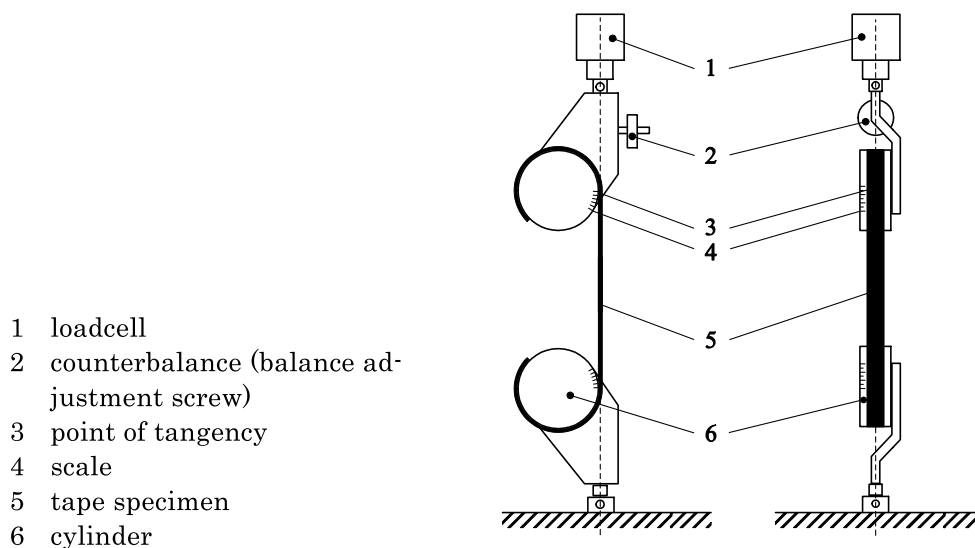


Figure 3 Equipment for testing filament reinforced tapes

8.4 Results

Take the arithmetic mean of the measurements made, and record the result in newtons per 10 mm (N/10 mm) for the breaking strength, and in percentage (%) for the elongation at break.