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JIS P 8115 : 2001
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**Paper and board—Determination of
folding endurance—MIT method**

ICS 85.060

Descriptors : paper, board (paper), endurance testing, bend testing

Reference number : JIS P 8115 : 2001 (E)

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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 a result of proposal for revision of Japanese Industrial Standard submitted by the Japan Technical Association of the Pulp and Paper Industry (JAPAN TAPPI)/the Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law. Consequently **JIS P 8115 : 1994** is replaced with this Standard.

For conforming to the International Standard, this revision employs **ISO 5626 : 1993 Paper—Determination of folding endurance** as the basis.

Date of Establishment: 1952-10-23

Date of Revision: 2001-09-20

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Technical Committee on Paper and Pulp

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

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Paper and board— Determination of folding endurance— MIT method

Introduction This Japanese Industrial Standard has been prepared based on **ISO 5626 Paper—Determination of folding endurance** published in 1993 as the second edition with modifying the technical contents to some extent.

The portions underlined with dots in this Standard are the matters not included in the corresponding International Standard.

1 Scope This Standard specifies the methods for the determination of folding endurance of paper and board using MIT testers.

Remarks 1 This Standard applies to the paper and board of thickness not more than 1.25 mm.

2 The **fold number** specified in this Standard for measurement is scheduled to be withdrawn on March 31, 2003.

3 The International Standard corresponding to this Standard is as follows.

In addition, the symbol which denotes the degree of correspondence in the contents between the relevant International Standard and JIS is MOD (modified) according to **ISO/IEC Guide 21**.

ISO 5626 : 1993 *Paper—Determination of folding endurance* (MOD)

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 0001 *Paper, board and pulp—Vocabulary*

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

Remarks : The items cited from **ISO 186 : 1994 Paper and board—Sampling to determine average quality** are equivalent to the corresponding parts of the said standard.

JIS P 8111 *Paper, board and pulps—Standard atmosphere for conditioning and testing*

Remarks : The items cited from **ISO 187 : 1990 Paper, board and pulps—Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples** are equivalent to the corresponding parts of the said standard.

JIS Z 8401 *Guide to the rounding of numbers*

JIS Z 9041-1 *Statistical interpretation of data—Part 1 : Statistical presentation of data*

3 Definitions For the purposes of this Standard, the definition given in **JIS P 0001** and the following definitions apply.

- a) **double fold** One complete oscillation of the test piece, during which it is folded first backwards and then forwards about the same line.
- b) **fold number** The number of double folds required to cause rupture of the test piece of the paper and board.
- c) **folding endurance** Logarithm (to the base 10) of the number of double folds required to cause rupture of the test piece.
- d) **ISO fold number** Antilogarithm of the mean folding endurance.

4 Principle of the methods Folding backwards and forwards in a standardized manner of a narrow strip of paper subjected to a longitudinal stress, until it breaks.

5 Apparatus The apparatus shall be as follows:

5.1 Spring-loaded clamp The spring-loaded clamp to apply a load to a test piece shall be constrained to move vertically to the rotation axis of the folding apparatus and the surfaces gripping the test piece are in the plane of this axis (see Fig. 1). A specified load is applied by a spring through the plunger to the clamp and is adjustable to provide any desired tension on the test piece from a range of at least 4.9 N to 14.7 N and load deflection when the load is applied is 17^{+2}_0 mm to 9.8 N.

5.2 Folding clamp The folding clamp shall be provided with the opening on which a test piece is fixed and two smooth surfaces parallel to the rotation axis. The axis of rotation shall be placed on the same axis as the two surfaces and at the centre of them. The folding apparatus shall fix the folding clamp and fold the test piece by $135 \pm 2^\circ$ left and rightward to a vertical line. Each folding face of the folding clamp shall have a radius of curvature of 0.38 ± 0.02 mm and a length of not less than 19.0 mm. The opening of the folding clamp shall be sufficiently wider than the thickness of the test piece but a clearance between the opening and the test piece shall be not more than 0.25 mm. The lower end of the test piece shall be gripped at a place 9.5 mm below the axis of rotation.

Remarks : The temperature rise of the test piece caused by the heating of the paper itself resulted from folding and the heat generated by the motor of the apparatus is liable to make the test piece fragile and the measured value lower and, therefore, it is recommended to install a cooling fan near the folding clamp.