

Australian/New Zealand Standard™

Methods of test for pulp and paper

**Method 431rp: Taber bending
resistance of paper and paperboard**



AS/NZS 1301.431rp:2006

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee PK-019, Methods of Test for Pulp and Paper. It was approved on behalf of the Council of Standards Australia on 7 September 2006 and on behalf of the Council of Standards New Zealand on 20 October 2006.
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The following are represented on Committee PK-019:

Australian Plantation Products and Paper Industry Council (A3P)
Appita
CSIRO Forestry and Forest Products
Ensis Papro, SCION
National Association of Forest Industries

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Foreword

This standard was prepared by Joint Technical Committee PK-019, Methods of Test for Pulp and Paper, as part of AS/NZS 1301, *Methods of test for pulp and paper*.

This edition cancels and replaces AS 1301.431rp—1989.

This Standard conforms to ISO 2493, but the ISO Standard includes instruments other than the Taber instrument. The ISO Standard requires the deflection angle to be accurate to within 0.1°. In normal operation it is not possible to ensure that this accuracy is achieved with the Taber instrument, but special effort must be made to ensure that the angle is as close as possible to 15°.

Similar Standards are:

TAPPI T489-om04

BS 3748:1992

Bending stiffness can be defined mathematically as:

$$\frac{El}{b}$$

where

E = modulus of elasticity (Young's modulus)

l = second moment of area (moment of inertia) of the cross-sectional area, about an axis through the centre of that area, in its plane and perpendicular to the direction of bending

b = width of the cross-sectional area

If it could be shown that the deflection of the test piece remained within the elastic limits, the bending stiffness may be calculated from:

$$S = \frac{19.1FL^2}{\theta b}$$

where

S = bending stiffness, in mN.m

F = bending force, in N

L = bending length, in mm

b = test piece width, in mm

θ = angular deflection

The term 'normative' has been used in this Standard to define the application of the annex to which it applies. A 'normative' annex is an integral part of a Standard.

NOTES

Taber bending resistance of paper and paperboard

1 Scope

This standard prescribes the procedure for measuring the bending resistance of paper or paperboard using the Taber stiffness tester. Although this instrument is called a stiffness tester, it cannot be used to measure stiffness because most paper and paperboard materials, when tested according to this method, are bent beyond their elastic limit. Bending resistance is defined as the force required to bend, under specified conditions, a rectangular test piece of the paper or paperboard which is clamped at one end. The method is applicable to paper and paperboard having a bending resistance value in the range 10 to 9000 mN.

NOTE 1 — Bending stiffness of paper and paperboard is defined as the moment of resistance per unit width that a paper or paperboard offers to bending within the limits of elastic deformation (see Foreword).

The apparatus and the procedure in this Standard are written specifically for the Taber model 150-B stiffness tester.

2 Normative references

The following documents are referred to in this Standard.

AS/NZS

1301.414s Conditioning of paper for testing

1301.415s Standard atmosphere for testing paper and board and procedure for monitoring the atmosphere

3 Apparatus

3.1 Taber stiffness tester

The Taber stiffness tester (see Figure 1) has the following:

- (a) A pendulum (A), so mounted that it meets the friction requirements for the bearing as given in Annex A, and carries a clamp (C) which is provided with two clamping screws for holding and centring the test piece. The lower edge of the clamp coincides with the centre of the pendulum bearing. The pendulum, which is balanced, has at its lower end a stud (D) to which weights may be attached, and which loads the pendulum at a distance of 100 mm from its centre. When no weight is attached the loading at the stud (D) is 98.1 mN.

NOTE 2 — Some instruments may be modified by inverting the driving arm attachments (G) and placing a compensating weight on the small stud above the clamp. This reduces the cantilever loading length to 10 mm, and the scale factor to one-tenth of the value given in Table 1.

The use of the instrument in this way does not give results which are comparable with those obtained by the procedure prescribed and such use is therefore not in accordance with this Standard.

The upper end of the pendulum is engraved with a line (E) which coincides with the centre line of the clamp jaws and the weight stud.

- (b) A disc (F), which rotates in a vertical plane on the same axis as the pendulum, is driven by a geared reversible electric motor at a rate of $180 \pm 20^\circ$ per minute.

NOTE 3 — The Taber Model 150-B is designed to operate at a disc speed of 180° per minute on 50 Hz power. On 60 Hz power, the disc rotates at 216° per minute.