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Corrugated fibreboard — Determination of thickness

Carton ondulé — Détermination de l'épaisseur

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FOREWORD

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Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3034 was drawn up by Technical Committee ISO/TC 6, *Paper, board and pulps*, and circulated to the Member Bodies in January 1973.

It has been approved by the Member Bodies of the following countries :

Belgium	Ireland	Sweden
Canada	Israel	Switzerland
Czechoslovakia	New Zealand	Thailand
Egypt, Arab Rep. of	Norway	Turkey
Finland	Poland	United Kingdom
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Hungary	South Africa, Rep. of	U.S.S.R.
India	Spain	

No Member Body expressed disapproval of the document.

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Corrugated fibreboard — Determination of thickness

1 SCOPE

This International Standard specifies a method for determining the thickness of corrugated fibreboard intended for use in the manufacture of packing cases or used inside such packing cases.

2 FIELD OF APPLICATION

This method is applicable to all types of corrugated fibreboard.

3 REFERENCES

ISO/R 186, *Method of sampling paper and board for testing.*

ISO 187, *Paper and board — Conditioning of test samples.* [1)]

4 PRINCIPLE

Measurement of the thickness of a test piece of the corrugated fibreboard under specified pressure.

5 DEFINITION

For the purposes of this International Standard, the following definition applies.

thickness (of a single sheet of corrugated fibreboard) : The distance between two plane parallel surfaces of a micrometer between which a test piece is subjected to the specified pressure.

6 APPARATUS

Dial gauge micrometer with a plane circular anvil and a concentric plane plunger. The area of contact of the anvil and of the face of the plunger shall be 10 ± 0,2 cm^2.

The measuring surfaces shall be parallel to within 1 part in 1 000 of their diameter, and the pressure exerted by the plunger shall be 20 ± 0,5 kPa.

The instrument shall be sufficiently accurate to permit measurement to be made to the nearest 0,05 mm. (See annex.)

7 SAMPLING

Sampling shall be carried out in accordance with ISO/R 186.

8 PREPARATION OF TEST PIECES

Select specimens large enough to permit the cutting of test pieces with an area of 500 cm^2 (200 mm × 250 mm). Test pieces shall be free from damage or other irregularities and, unless otherwise agreed between the interested parties, free from converting machine marks.

9 CONDITIONING

The test pieces shall be conditioned in accordance with ISO 187.

10 PROCEDURE

Carry out the tests in the standard atmosphere defined in ISO 187.

Make two measurements on each test piece, as follows.

Place the test piece horizontally between the two faces of the instrument in such a manner that the edges of the test piece are at least 50 mm from the nearest point on the circumference of the anvil. Lower the pressure foot gently, slowly [2)] and very carefully into the test piece so that all punching effect is avoided; ensure that the test piece remains parallel to the measuring surfaces of the micrometer, despite the effect of leverage caused by the mass of the test piece. Furthermore, no stress shall be imposed on the instrument or the test piece by the hand when a reading is being taken. The reading shall be taken when the pointer has ceased to move.

1) At present at the stage of draft. (Revision of ISO/R 187.)

2) At a speed of about 2 to 3 mm/s.

11 TEST REPORT

The test report shall include the following particulars :

a) a reference to this International Standard;

b) the date and place of testing;

c) a description and identification of the material tested;

d) the conditioning atmosphere used;

e) the number of individual measurements made;

f) the standard deviation of the thickness[1] ;

g) the arithmetic mean of all the measurements, in millimetres, to the nearest 0,05 mm;

h) details of any deviation from this test method;

i) any other information which may assist in the interpretation of the test results; in particular, whether any areas compressed by printing or other converting machines are involved.

1) The precision of the mean (confidence limits) at the 95 % probability level should be quoted for information.

ANNEX

ADDITIONAL NOTES REGARDING MEASURING APPARATUS

A.1 MEASURING CAPACITY

To cover the range of corrugated fibreboards normally encountered, it is desirable that the measuring capacity of the dial gauge micrometer should be at least 20 mm.

A.2 CALIBRATION OF THE INSTRUMENT

For instruments in frequent use, the calibration should be checked daily for repeatability and accuracy, and monthly for parallelism and foot pressure.

If the instrument is not within the tolerance for any test, it should be corrected before subsequent tests are performed.

Checking should be carried out in the following order :

A.2.1 Planarity of foot and anvil

The pressure foot and the anvil should be carefully wiped and opened slightly so that the gap can be seen against a bright light. The gap should be quite even when observed in two directions at right angles.

A.2.2 Pressure exerted by the foot

Any suitable means of checking its accuracy and uniformity may be used.

A.2.3 Repeatability of measurement and determination of indication error

a) Set the instrument correctly at zero before commencing.

b) Use a set of gauges of different thicknesses which have previously been checked.

c) Insert these individually between the anvil and the pressure foot and note the corresponding reading on the scale.

d) Check the instrument at approximately 10, 30, 50, 70 and 90 % of the full-scale reading.

e) A series of at least five readings should be taken at the zero position, followed by at least five readings on each gauge and finally a further set of at least five readings at the zero position.

f) The instrument should not be reset to zero during the procedure.

For each check point on the scale, repeatability of measurement is the standard deviation of the five or more readings taken; indication error is the difference between the mean of the five or more readings and the gauge thickness.

A.2.4 Parallelism of foot and anvil

a) Insert a gauge on the edge at one side of the pressure foot and note the thickness shown on the scale.

b) Insert the same gauge on the edge of the opposite side and note again the thickness shown on the scale.

c) Repeat the procedure at right angles to the original position.

d) Repeat the procedure with other gauges at approximately 10, 30, 50, 70 and 90 % of the full-scale readings.

The error of parallelism is defined as half the square root of the sum of the squares of the difference between the opposite readings at the ends of the two perpendicular diameters, i.e.

$$\frac{1}{2}\sqrt{d_1^2 + d_2^2}$$

where d_1 and d_2 are each the difference between measurements at two opposite points.

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