INTERNATIONAL STANDARD ISO 3036

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Board — Determination of puncture resistance

Carton — Détermination de la résistance à la perforation

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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 3036 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	India	Spain
Canada	Ireland	Sweden
Czechoslovakia	Israel	Switzerland
Egypt, Arab Rep. of	New Zealand	Thailand
Finland	Norway	Turkey
France	Poland	United Kingdom
Germany	Romania	U.S.A.*
Hungary	South Africa, Rep. of	U.S.S.R.

* with the exception of sub-clause 5.1.1.

No Member Body expressed disapproval of the document.

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Board — Determination of puncture resistance

0 INTRODUCTION

Several makes of instrument, differing only in minor details, are used for the measurement of the puncture resistance of board. The results obtained with these different makes of instrument are similar but not necessarily identical. Therefore, for purposes of comparison, it is essential to ensure that the same make of instrument is used for all tests.

1 SCOPE

This International Standard specifies a method for determining the puncture resistance of board.

2 FIELD OF APPLICATION

This method is applicable to all types of heavy board, including corrugated fibreboard, especially those used in the manufacture of packing cases.

3 REFERENCES

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

ISO 187, *Paper and board — Conditioning test samples.*

4 PRINCIPLE

Subjection of a test piece from a representative sample of board to puncture by a triangular pyramid puncture head attached to a pendulum.

Measurement of the energy required to force the puncture head completely through the test piece, i.e. to make the initial puncture and to tear and bend open the board.

5 APPARATUS

5.1 Description of apparatus

The apparatus used is a puncture tester, which produces an impact by means of a pendulum.

The bed plate of the frame of the instrument shall be firmly attached to a strong base to prevent energy losses. The instrument shall be accurately levelled, and shall not vibrate during the test.

NOTE — The instrument shall be so designed that the energy contained in the pendulum in each of the measuring ranges corresponds to the respective scale (see annex).

The instrument consists of the following elements :

5.1.1 Pendulum and puncture head

The pendulum is fitted with an arm, having the shape of a 90° circular arc, to which the puncture head is attached. Both pendulum and arm shall be strong enough to minimize deformation and vibration when the test is carried out.

The puncture head shall be a right-angled triangular pyramid, 25 ± 0,7 mm high, with edges between sides honed to a radius between 1,0 and 1,6 mm.

One of the edges of the base of the pyramid shall be parallel to the axis of rotation of the pendulum, and the opposite corner of the base shall point towards the axis of rotation.

The axis of symmetry through the effective point of the puncture head shall be vertical when it is half-way through the horizontal plane through the axis of the pendulum.[1)]

At the release point, the pendulum shall be in the horizontal position, which is determined by measuring through an angle of 90° from the pendulum with its centre of gravity at rest.

5.1.2 Interchangeable weights

By the use of interchangeable weights that can be attached to the pendulum, several ranges of energy are provided.

The range selected shall be such that the test result will be between 20 and 80 % of the maximum value of the corresponding scale.

5.1.3 Release mechanism

A safety catch shall be provided to prevent accidental release of the pendulum. The release mechanism shall not impart any acceleration or deceleration to the pendulum.

1) To allow the use of existing instruments, a tolerance of ± 12,5 mm is acceptable on the distance between the mid-point and the horizontal plane.