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# INTERNATIONAL STANDARD 3038

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Corrugated fibreboard — Determination of the water resistance of the glue bond by immersion

*Carton ondulé — Détermination par immersion de la résistance à l'eau des lignes de collage*

First edition — 1975-05-01 **TeH STANDARD PREVIEW**  
(standards.iteh.ai)

[ISO 3038:1975](#)

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UDC 676.273.3 : 676.017.63

Ref. No. ISO 3038-1975 (E)

**Descriptors** : corrugated cardboards, tests, adhesion tests, submerging tests.

## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

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 3038 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	<u>ISO 3038:1975</u>
Bulgaria	Ireland	<a href="https://standards.iteh.ai/catalog/standards/sist/430d54dc-80bd-4b6d-9240-609b2a7f53d/iso-3038-1975">https://standards.iteh.ai/catalog/standards/sist/430d54dc-80bd-4b6d-9240-609b2a7f53d/iso-3038-1975</a>
Czechoslovakia	Israel	Spain
Egypt, Arab Rep. of	New Zealand	Sweden
Finland	Norway	Switzerland
France	Poland	Thailand
Germany	Romania	Turkey
Hungary	South Africa, Rep. of	United Kingdom
		U.S.S.R.

The Member Body of the following country expressed disapproval of the document on technical grounds :

Canada

# Corrugated fibreboard – Determination of the water resistance of the glue bond by immersion

## 1 SCOPE

This International Standard specifies an immersion method for determining the water resistance of the glue bond of corrugated fibreboard.

## 2 FIELD OF APPLICATION

This method is applicable to all types of corrugated fibreboard and in particular to corrugated fibreboards in which a high degree of resistance to wet conditions is required.

## 3 REFERENCE

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

## 4 PRINCIPLE

Measurement of the length of time during which a predetermined combination of glue lines, immersed in water, resists the pull of a suspended weight in the plane vertical axis of the corrugated fibreboard, perpendicular to the glue lines.

## 5 APPARATUS

**5.1 Water tank**, preferably made of glass for easy observation, large enough for the free suspension of the required number of test pieces and having a depth of not less than 250 mm. The bottom of a glass tank may be lined with a rubber sheet to prevent damage.

**5.2 Rods or bars**, with hooks, placed across the tank for suspension of the test pieces.

**5.3 Means for proper identification of test pieces.**

**5.4 Soft rubber stamp**, with an **inking device** to mark the sample of corrugated fibreboard with outlines and other details for cutting the test pieces. The design to be imprinted on the corrugated fibreboard is shown in figure 1.

**5.5 Knife** with a sharp, thin blade.

**5.6 Straightedge.**

**5.7 Punch pliers.**

**5.8 Eyelet pliers and eyelets.**

**5.9 Piece of copper**, fitted with a hook or a gripper, having total mass of  $250 \pm 1$  g per test piece. A piece of a different metal may be used provided that corrections are made to the hydrostatic weight.

**5.10 Adhesive tape**, pressure sensitive, 20 to 30 mm width, and resistant to water under the conditions of the test.

## 6 SAMPLING

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

Individual samples shall be large enough to permit the cutting of five test pieces of  $20 \pm 1$  mm by 150 mm (i.e. at least 100 mm X 150 mm), with the flutes at right angles to the length of the test piece.

The corrugated fibreboard to be tested shall generally be 3 days old to allow it to develop its water-resistance properties. The time will be dependent on temperature and adhesive formulation.

## 7 PREPARATION OF TEST PIECES

Mark at least five specimens of the corrugated fibreboard with the rubber stamp (5.4) and cut out the five test pieces from each specimen, taking care not to damage the glue bond. Unless otherwise agreed, test pieces shall be free from irregularities and damage, especially by water.

Reinforce the lower end of each test piece by winding pressure-sensitive tape (5.10) around it.

Punch two holes in each test piece, at the positions marked by the rubber stamp. Insert eyelets (5.8) into these holes and clench them.

Alternatively, a suitable clamp may be used to suspend the test pieces from the rod. A copper clamp may be used at the lower end to suspend the weight. This clamp and any additional copper weight shall have a total mass of  $250 \pm 1$  g.

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## 8 PROCEDURE

### 8.1 Determination of the glue lines to be tested

The shearing stress is to be concentrated on five glue lines to be tested within zone M (see figures 1 and 2).

Isolate these glue lines by such cuts through the components as may be necessary to achieve this object (see figures 2 and 3 for example).

### 8.2 Immersion

Suspend at least five similar test pieces containing the set of glue lines to be tested, with their reinforced ends loaded with weights (see 5.9), in the tank (5.1) filled with distilled water at  $20 \pm 3$  °C, up to a level ensuring that all M zones (see 8.1) of the test pieces remain immersed 25 mm below the surface of the water throughout the test period.

Care shall be taken to avoid the inclusion of air bubbles in the flutes.

Individual test pieces shall not be used to test more than one set of five glue lines between the selected liner and its fluting.

Check the immersed test pieces for failure at intervals of 24 h or at such shorter intervals as may be suitable. Failure is indicated by complete separation of the five bonds, which will cause the weight to drop. An automatic system may also be used that allows the moment of rupture (drop) to be indicated.

Repeat the procedure with the remaining test pieces.

## 9 EXPRESSION OF RESULTS

Express the water resistance of the glue bond of a test piece by the duration, in hours, corresponding to the moment or the interval at which the rupture is noted.

## 10 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 product tested;
- d) the identification of each sample tested;

and, for each set of five adjacent glue lines tested :

- e) the number of test pieces;
- f) the number of failures at the chosen test intervals, indicating the interval between the observations. If automatic timing is used, state the time to failure for each test piece;

g) a statement whether after rupture :

- fibres adhere to the adhesive;
- adhesive predominates on the fibre surface;

h) details of any deviation from this International Standard;

i) any other information that may assist in the interpretation of the test results.

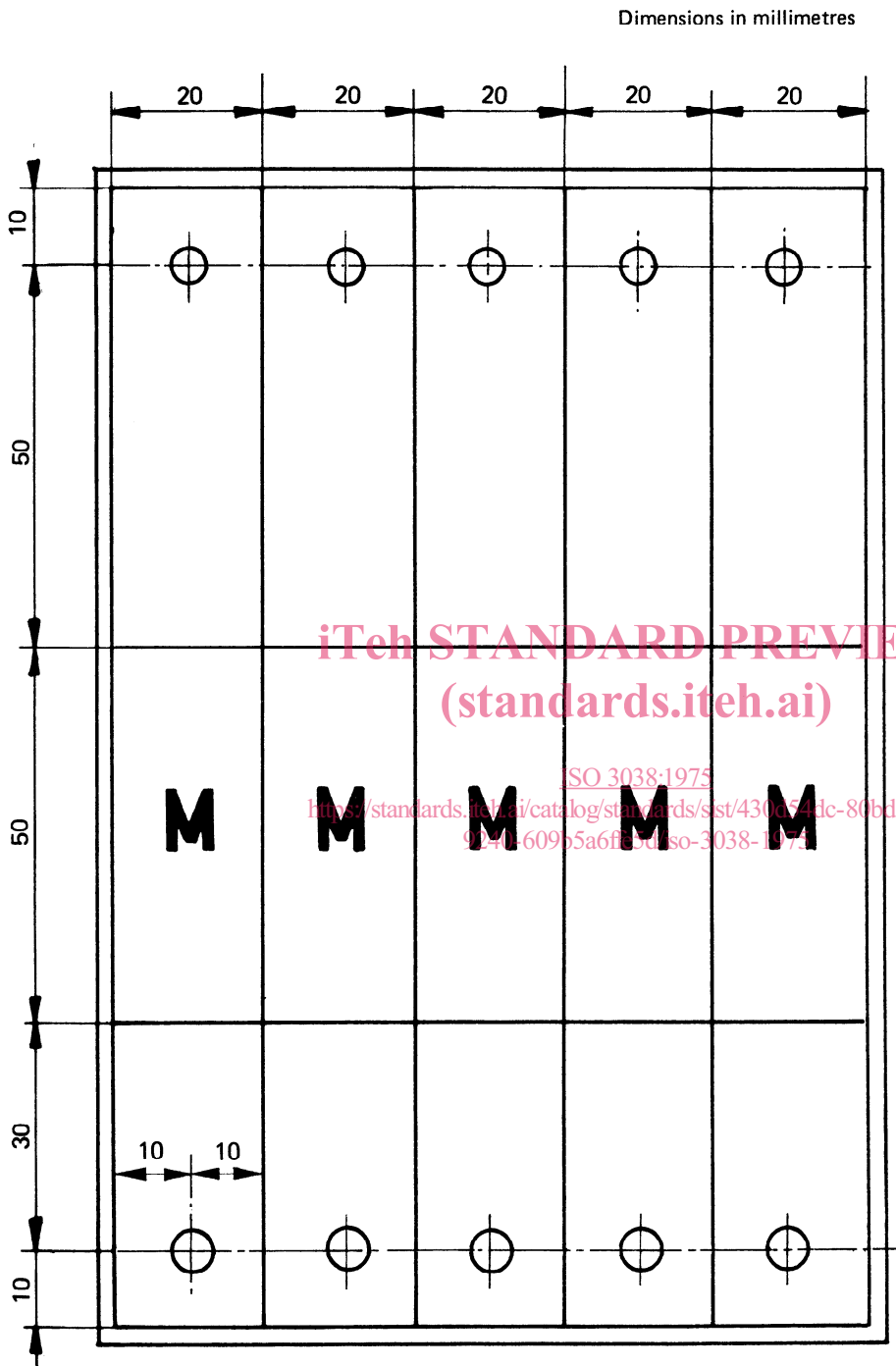


FIGURE 1 – Rubber stamp for making out five test pieces

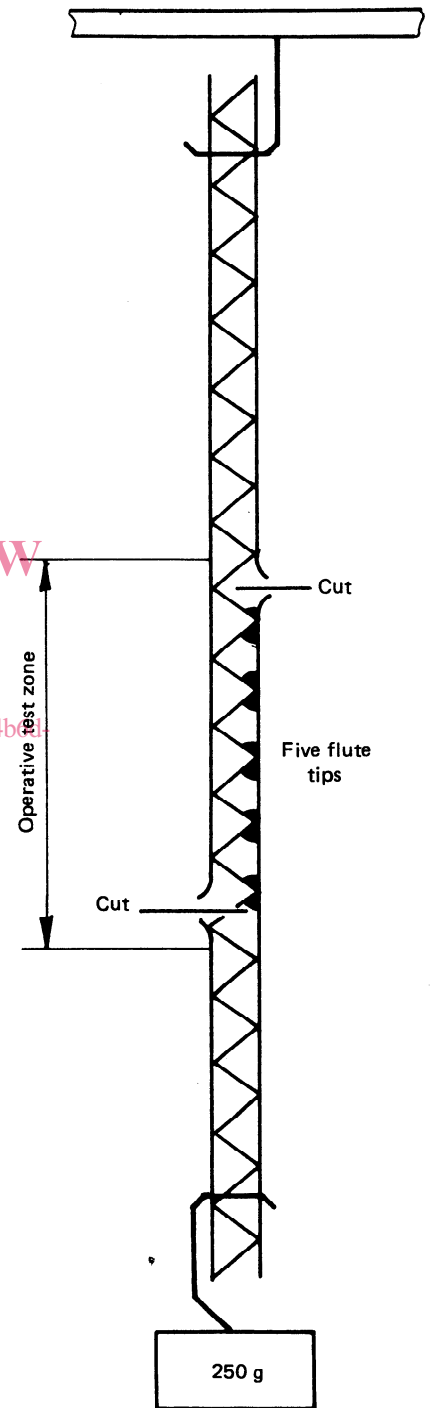
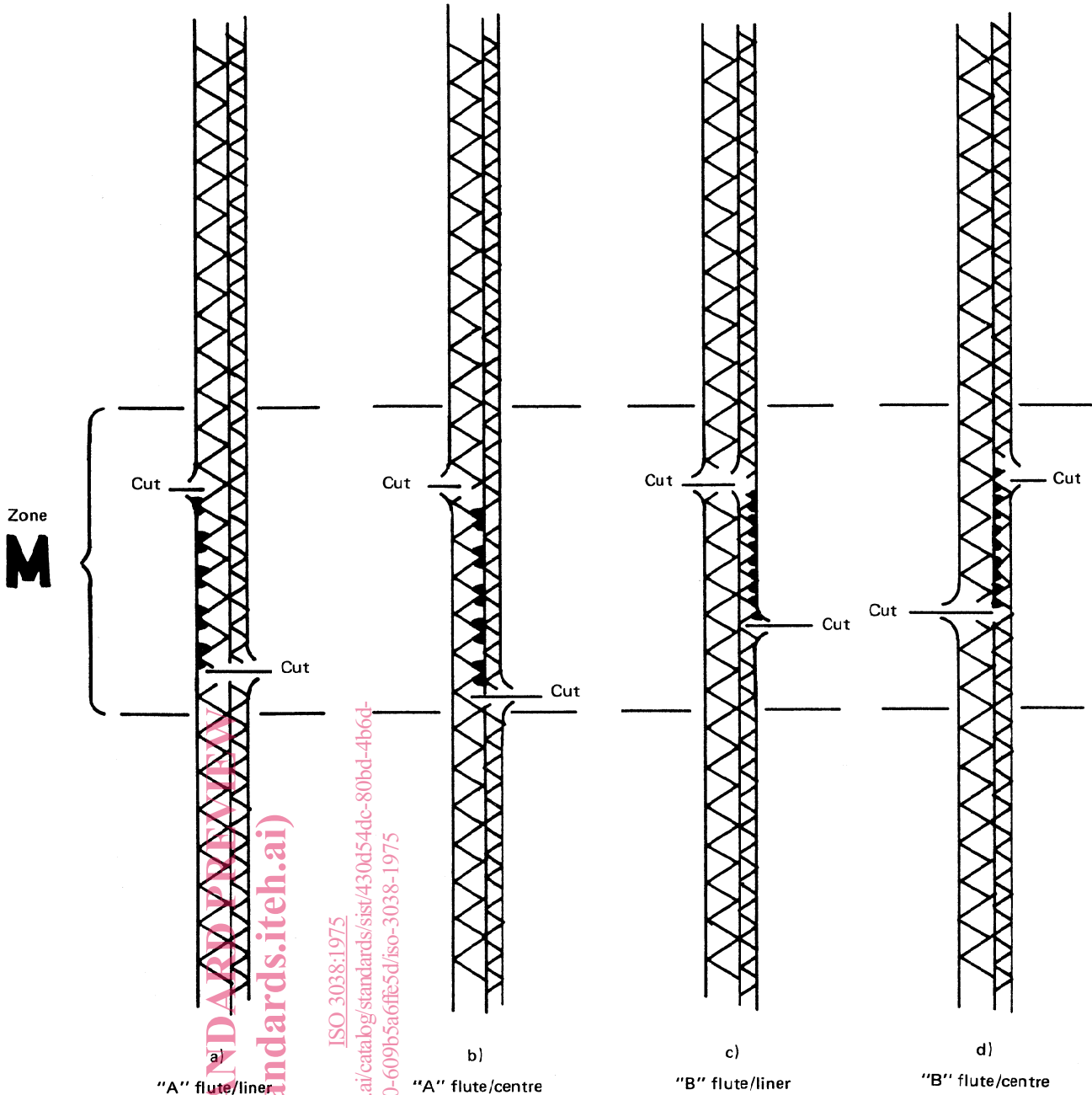


FIGURE 2 – Diagram showing suspension arrangement and typical cuts in single-wall board



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FIGURE 3 — Diagram showing typical cuts in double-wall board to isolate the five glue lines to be tested

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