SLOVENSKI STANDARD
SIST EN 60068-2-31:2001

01-september-2001

Basic environmental testing procedures - Part 2: Tests - Test Ec: Drop and topple, primarily for equipment-type specimens

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Grundlegende Umweltprüfverfahren -- Teil 2: Prüfungen - Prüfung Ec: Kippfallen und Umstürzen, vornehmlich für Geräte

Essais fondamentaux climatiques et de robustesse mécanique -- Partie 2: Essais - Essai Ec: Chute et culbute, essai destiné en premier lieu aux matériels

Ta slovenski standard je istoveten z: **EN 60068-2-31:1993**

ICS:

19.040	Preskušanje v zvezi z okoljem	Environmental testing

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Descriptors: Electricity, equipment, mechanical test, drop, topple, jolts, procedures, equipment specifications writing

ENGLISH VERSION

Basic environmental testing procedures
Part 2: Tests
Test Ec: Drop and topple, primarily for equipment-type specimens
(IEC 68-2-31:1969 + A1:1982)

Essais fondamentaux climatiques et de robustesse mécanique
Deuxième partie: Essais
Essai Ec: Chute et culbute, essai destiné en premier lieu aux matériels
(CEI 68-2-31:1969 + A1:1982)

Grundlegende Umweltprüfverfahren
Teil 2: Prüfungen
Prüfung Ec: Kippfallen und Umstürzen, vornehmlich für Geräte
(IEC 68-2-31:1969 + A1:1982)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

FOREWORD

At the request of CENELEC Reporting Secretariat SR 50A, HD 323.2.31 S1:1988 (IEC 68-2-31:1969 + A1:1982) was submitted to the CENELEC voting procedure for conversion into a European Standard.

The text of the International Standard was approved by CENELEC as EN 60068-2-31 on 9 March 1993.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1994-03-01
- latest date of withdrawal of conflicting national standards	(dow)	-

ENDORSEMENT NOTICE

The text of the International Standard IEC 68-2-31:1969 and its amendment 1:1982 was approved by CENELEC as a European Standard without any modification.

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

(affiliée à l'Organisation Internationale de Normalisation — ISO)

RECOMMANDATION DE LA C E I

INTERNATIONAL ELECTROTECHNICAL COMMISSION

(affiliated to the International Organization for Standardization — ISO)

I E C RECOMMENDATION

Publication 68-2-31

Première édition — First edition

1969

Essais fondamentaux climatiques et de robustesse mécanique

Deuxième partie: Essais — Essai Ec: Chute et culbute, essai destiné en premier lieu aux matériels

Basic environmental testing procedures

Part 2: Tests — Test Ec: Drop and topple, primarily for equipment-type specimens

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

BASIC ENVIRONMENTAL TESTING PROCEDURES

Part 2: Tests — Test Ec: Drop and topple, primarily for equipment-type specimens

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote this international unification, the IEC expresses the wish that all National Committees having as yet no national rules, when preparing such rules, should use the IEC recommendations as the fundamental basis for these rules in so far as national conditions will permit.

4) The desirability is recognized of extending international agreement on these matters through an endeavour to harmonize national standardization rules with these recommendations in so far as national conditions will permit. The National Committees pledge their influence towards that end.

PREFACE

This Recommendation has been prepared by Sub-Committee 50A, Shock and Vibration Tests, of IEC Technical Committee No. 50, Environmental Testing.

A first draft was discussed at the meeting held in London in 1966. The new draft was discussed at the meeting held in Stockholm in 1968, as a result of which a definitive draft was submitted to National Committees for approval under the Six Months' Rule in September 1968.

The following countries voted explicitly in favour of publication:

Australia	Japan
Austria	Netherlands
Belgium	Norway
Canada	Romania
Czechoslovakia	South Africa
Denmark	Sweden
Finland	Switzerland
France	Turkey
Germany	Union of Soviet Socialist Republics
Hungary	United Kingdom
Israel	

BASIC ENVIRONMENTAL TESTING PROCEDURES

Part 2: Tests — Test Ec: Drop and topple, primarily for equipment-type specimens

1. Object

To assess the effects upon a specimen of simple standard tests intended to be representative of the knocks and jolts likely to occur during repair work or rough handling in use on a table or bench.

Tests of this type may also be used to demonstrate a minimum degree of robustness for the purpose of assessing safety requirements.

This test is primarily intended for specimens not in their packing and for items in their transport cases, when the latter may be considered as part of the specimens themselves.

2. General

The test includes three distinct procedures:

a) Dropping on to a face (Sub-clause 3.2.1).
b) Dropping on to a corner (Sub-clause 3.2.2).
c) Toppling (or pushover) (Sub-clause 3.2.3).

The purpose of each of these procedures is basically the same, but they represent different kinds of handling.

The test is not intended to be a precise test and a tolerance of ± 10 % is allowed on the heights and angles prescribed in Clause 3.

Note. — For a more precise shock test, Test Ea: Shock (IEC Publication 68-2-27) should be used.

3. Testing procedures

3.1 *Initial measurements*

The specimen shall be visually examined and electrically and mechanically checked, as required by the relevant specification.

3.2 *Conditioning*

Having taken into account the manner in which the specimen will be handled in use and during repair, the relevant specification shall state the test procedure to be used and whether covers, cables, etc., are to be in position or not. The relevant specification shall also state whether the specimen is, or is not, operational during the test.

In the test procedures for dropping on to a face or corner, it is possible for the specimen to topple on to the next face instead of falling back on to the test face as intended. This shall be avoided by a suitable method.

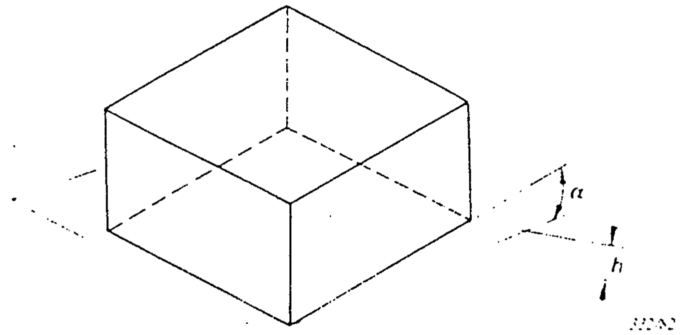
In any of the test procedures, the specimen shall not be allowed to continue rolling about the next edge.

Where the number of bottom edges exceeds four, the number of drops or topples shall be limited to four and the relevant specification shall prescribe the edges to be used for the test.

3.2.1 *Dropping on to a face*

3.2.1.1 The specimen, standing in its normal position of use, on a smooth, hard, rigid surface of concrete or steel, is tilted about one bottom edge so that the distance between the opposite edge and the test surface is 25 mm, 50 mm or 100 mm, as prescribed by the relevant specification, or so that the angle made by the bottom and the test surface is 30°, whichever condition is the less severe.

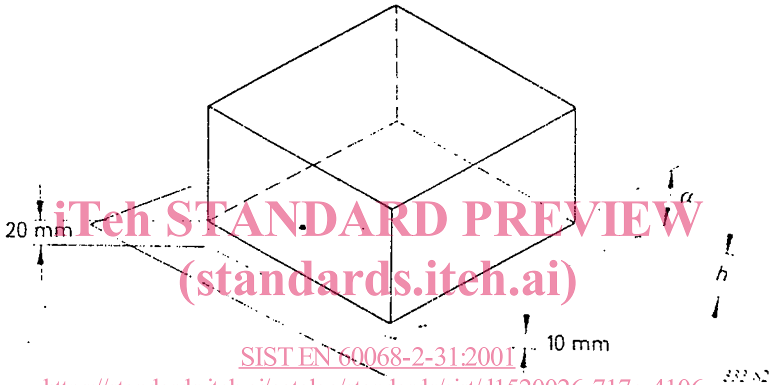
It is then allowed to fall freely on to the test surface.



h = distance entre une arête du specimen et la surface d'essai
α = angle formé par la face inférieure du spécimen et la surface d'essai

h = distance between edge of specimen and test surface
α = angle between bottom face of specimen and test surface

FIG. 1. – Chute sur une face (paragraphe 3.2.1 de la Publication 68-2-31 de la CEI).
Dropping on to a face (Sub-clause 3.2.1 of IEC Publication 68-2-31).



h = distance entre une arête du spécimen et la surface d'essai
α = angle formé par la face inférieure du spécimen et la surface d'essai

h = distance between edge of specimen and test surface
α = angle between bottom face of specimen and test surface

FIG. 2. – Chute sur un coin (paragraphe 3.2.2 de la Publication 68-2-31 de la CEI).
Dropping on to a corner (Sub-clause 3.2.2 of IEC Publication 68-2-31).

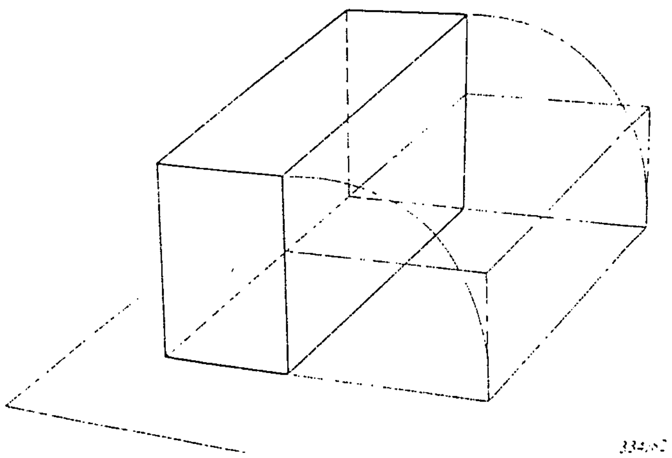


FIG. 3. – Culbute (paragraphe 3.2.3 de la Publication 68-2-31 de la CEI).
Topple (or push over) (Sub-clause 3.2.3 of IEC Publication 68-2-31).

3.2.1.2 The specimen shall be subjected to one drop about each of four bottom edges.

3.2.2 *Dropping on to a corner*

3.2.2.1 The specimen, standing in its normal position of use on a smooth, hard, rigid surface of concrete or steel, is raised above the test surface by placing a wooden stud 10 mm high under one corner, and a 20 mm wooden stud under the other adjacent corner of one of the bottom edges. The specimen is then lifted above the test surface by rotating it about the edge on the two studs, until the other corner adjacent to the 10 mm stud is raised 25 mm, 50 mm or 100 mm, as prescribed in the relevant specification, or so that the angle made by the specimen and the test surface is 30°, whichever condition is the less severe.

It is then allowed to fall freely on the the test surface.

3.2.2.2 The specimen shall be subjected to one drop on each of four bottom corners by applying the test along four bottom edges in turn.

3.2.3 *Topple (or push-over)*

3.2.3.1 The specimen, standing in its normal position of use on a smooth, hard, rigid surface of concrete or steel, is tilted about one bottom edge until it reaches a position of instability. It is then allowed to fall over freely from this position on to an adjacent face.

3.2.3.2 The specimen shall be subjected to one topple about each of four bottom edges.

3.3 *Final measurements*

The specimen shall be visually examined and electrically and mechanically checked, as required by the relevant specification.

4. Information to be included in the relevant specification

4.1 For specimens intended to withstand handling of the kind considered in this Recommendation, two dimensional ratios are important:

a) The ratio of the height of the centre of gravity from the base, to the smaller dimension of the base, hereinafter referred to as the *c - g* ratio.

b) The ratio of the height of the specimen to the smaller dimension of the base — the height ratio.

If the *c - g* ratio is small, for example less than 0.25, the specimen is unlikely to fall over due to sudden sideways displacements. If the height ratio is small, for example less than 0.5, the specimen is unlikely to topple over due to a sudden sideways force or blow at the top. In such cases, the writer of the relevant specification should consider whether the topple test is applicable.

4.2 When the test is included in the relevant specification, the following details shall be given as far as they are applicable:

	Sub-clause
a) Initial measurements	3.1
b) Conditioning procedure	3.2
c) Fitting of cables, covers, etc.	3.2
d) Whether the specimen is operational or not during the test	3.2
e) Edges to be used in the test, where there are more than four bottom edges	3.2
f) The height of drop on to a face	3.2.1.1
g) The height of drop on to a corner	3.2.2.1
h) Final measurements	3.3