SLOVENSKI STANDARD
SIST EN 60068-2-21:2001

01-marec-2001

Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices

Environmental testing -- Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices

Umweltprüfungen -- Teil 2-21: Prüfungen - Prüfung U: Widerstandsfähigkeit der Anschlüsse und integrierter Befestigungsmittel

Essais d'environnement -- Partie 2-21: Essais - Essai U: Robustesse des sorties et des dispositifs de montage incorporés

Ta slovenski standard je istoveten z: **EN 60068-2-21:1999**

ICS:

19.040	Preskušanje v zvezi z okoljem	Environmental testing
31.190	Sestavljeni elektronski elementi	Electronic component assemblies

SIST EN 60068-2-21:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60068-2-21

April 1999

ICS 19.040; 31.190

Supersedes EN 60068-2-21:1997 and its amendments

English version

Environmental testing
Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices
(IEC 60068-2-21:1999)

Essais d'environnement
Partie 2-21: Essais
Essai U: Robustesse des sorties et des dispositifs de fixation
(CEI 60068-2-21:1999)

Umweltprüfungen
Teil 2-21: Prüfungen
Prüfgruppe U: Mechanische Widerstandsfähigkeit der Anschlüsse
(IEC 60068-2-21:1999)

This European Standard was approved by CENELEC on 1999-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Ref. No. EN 60068-2-21:1999 E

Foreword

The text of document 91/156/FDIS, future edition 5 of IEC 60068-2-21, prepared by IEC TC 50, Environmental testing and published by IEC TC 91, Surface mounting technology, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60068-2-21 on 1999-04-01.

This European Standard supersedes EN 60068-2-21:1997 and its amendments A2:1997 and A3:1997.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2000-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2002-01-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60068-2-21:1999 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60068-1	1988	Environmental testing Part 1: General and guidance	EN 60068-1[1)]	1994
IEC 60068-2-20	1979	Part 2: Tests - Test T: Soldering	HD 323.2.20 S3[2)]	1988
IEC 60068-2-61	1991	Part 2: Test methods - Test Z/ABDM: Climatic sequence	EN 60068-2-61	1993
IEC 60249-2-4	1987	Base materials for printed circuits Part 2: Specifications - Specification No. 4: Epoxide woven glass fabric copper-clad laminated sheet, general purpose grade	EN 60249-2-4[3)] + corr. March	1994 1994
IEC 61191-2	1998	Printed board assemblies Part 2: Sectional specification Requirements for surface mount soldered assemblies	EN 61191-2	1998

1) EN 60068-1 includes the corrigendum October 1988 and A1:1992 to IEC 60068-1.

2) HD 323.2.20 S3 includes A2:1987 to IEC 60068-2-20.

3) EN 60249-2-4 includes A2:1992 to IEC 60249-2-4.

INTERNATIONAL STANDARD

IEC 60068-2-21

Fifth edition
1990-01

Environmental testing –

Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices

Essais d'environnement –

Partie 2-21: Essais – Essai U: Robustesse des sorties et des dispositifs de fixation

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE N

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ENVIRONMENTAL TESTING –

Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices

1 Scope

This part of IEC 60068 is applicable to all electrical and electronic components whose terminations or integral mounting devices are liable to be submitted to stresses during normal assembly or handling operations.

Table 1 provides details of the applicable tests.

Table 1 – Application

Test	Type	Component	Mounted/ not mounted
Ua_1	Tensile	Leaded devices	Not mounted
Ua_2	Thrust	Leaded devices	Not mounted
Ub	Bending	Leaded devices	Not mounted
Uc	Torsion	Leaded devices	Not mounted
Ud	Torque	Threaded stud or screw termination	Not mounted
Ue_1	Bending	Surface mounted devices	Mounted
Ue_2	Pull/push	Surface mounted devices	Mounted
Ue_3	Shear	Surface mounted devices	Mounted

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60068. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 60068 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60068-1:1988, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-20:1979, *Environmental testing – Part 2: Tests – Test T: Soldering*

IEC 60068-2-61:1991, *Environmental testing – Part 2: Tests – Test Z/ABDM: Climatic sequence*

IEC 60249-2-4:1987, *Base materials for printed circuits – Part 2 : Specifications – Specification No. 4: Epoxy woven glass fibre copper-clad laminated sheet, general purpose grade*

IEC 61191-2: —, *Printed board assemblies – Part 2: Sectional specification – Surface mount soldered assemblies* [1)]

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1) To be published.

Insulated wires shall be stripped of the insulation at the point at which the load is applied Stranded wires shall be united mechanically at the point of application of the load (such as by soldering or knotting), prior to the application of the load. Where the technical features of insulated or stranded wires may give rise to difficulties during the stripping, joining or knotting operations and be liable to cause dispute for the test results, such operations shall be in accordance with the relevant specification or, where necessary, with the instructions of the component manufacturer.

Table 2 – Value of applied force for test Ua_1

Nominal cross-sectional area (S)* mm²	Corresponding diameter (d) for circular-section wires mm	Force with tolerance of ±10 % N
$S \leq 0,05$	$d \leq 0,25$	1
$0,05 < S \leq 0,10$	$0,25 < d \leq 0,35$	2,5
$0,10 < S \leq 0,20$	$0,35 < d \leq 0,50$	5
$0,20 < S \leq 0,50$	$0,50 < d \leq 0,80$	10
$0,50 < S \leq 1,20$	$0,80 < d \leq 1,25$	20
$S > 1,20$	$d > 1,25$	40

* For circular-section wires, strips or pins, the nominal cross-sectional area is equal to the value calculated from the nominal dimension(s) given in the relevant specification. For stranded wires, the nominal cross-sectional area is obtained by taking the sum of the cross-sectional areas of the individual strands of the conductor specified in the relevant specification.

b) Other terminations (tag terminations, threaded studs, screws, terminals, etc.)

The value of the force to be applied shall be given in the relevant specification.

3.6 Final measurements

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

3.7 Information to be given in the relevant specification

	Subclause
a) Method of preconditioning	3.3
b) Initial measurements	3.4
c) Number of terminations to be tested, if more than three	3.5.1
d) Force (for oversized and other terminations)	3.5.2
e) Details of stripping, joining or knotting operations, if necessary	3.5.2
f) Final measurements	3.6

Table 3 – Value of applied force for test Ua_2

Nominal cross-sectional area (S)* mm²	Corresponding diameter (d) for circular-section wire mm	Force with tolerance of ±10 % N
$S \leq 0,05$	$d \leq 0,25$	0,25
$0,05 < S \leq 0,10$	$0,25 < d \leq 0,35$	0,5
$0,10 < S \leq 0,20$	$0,35 < d \leq 0,50$	1
$0,20 < S \leq 0,50$	$0,50 < d \leq 0,80$	2
$0,50 < S \leq 1,20$	$0,80 < d \leq 1,25$	4
$S > 1,20$	$d > 1,25$	8

* For circular-section wires, strips or pins, the nominal cross-sectional area is equal to the value calculated from the nominal dimension(s) given in the relevant specification.

Insulated wires shall be stripped of the insulation at the point at which the load is applied. Where the technical features of insulated wires may give rise to difficulties during the stripping, and be liable to cause dispute for the test results, such operations shall be in accordance with the relevant specification or, where necessary, with the instructions of the component manufacturer.

b) Other terminations (tag terminations, threaded studs, screws, terminals, etc.)

The value of the force to be applied shall be given in the relevant specification.

4.6 Final measurements

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

4.7 Information to be given in the relevant specification

	Subclause
a) Method of preconditioning	4.3
b) Initial measurements	4.4
c) Indication as to whether the test is applicable	4.5.1
d) Number of terminations to be tested, if more than three	4.5.1
e) Direction of applied force	4.5.1
f) Details of stripping, if necessary	4.5.2
g) Force, for other than wire terminations or pins	4.5.2
h) Final measurements	4.6