IEC 60068-2-75

Edition 2.1 2025-10

INTERNATIONAL STANDARD

Corrected version
2025-12

CONSOLIDATED VERSION

Environmental testing -
Part 2-75: Tests - Test Eh: Hammer tests

ICS 19.040

ISBN 978-2-8327-0803-3

IEC 60068-2-75:2014-09+AMD1:2025-10 CSV(en)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2025 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD 3
INTRODUCTION 5
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Provisions common to all hammer test methods 7
4.1 Severities 7
4.1.1 General 7
4.1.2 Impact energy value 7
4.1.3 Number of impacts 7
4.2 Test apparatus 8
4.2.1 Description 8
4.2.2 Mounting 9
4.3 Preconditioning 9
4.4 Initial measurements 9
4.5 Testing 9
4.5.1 General 9
4.5.2 Attitudes and impact locations 9
4.5.3 Preparation of the specimen 9
4.5.4 Operating mode and functional monitoring 9
4.6 Recovery 10
4.7 Final measurements 10
4.8 Information to be given in the relevant specification 10
5 Test Eha: Pendulum hammer 10
5.1 Test apparatus 10
5.1.1 General 10
5.1.2 Test apparatus for severities not exceeding 1 J 11
5.1.3 Test apparatus for severities of 2 J and above 11
5.2 Height of fall 11
5.3 Testing 11
6 Test Ehb: Spring hammer 12
6.1 Test apparatus 12
6.2 Influence of earth's gravity 13
6.3 Calibration 13
7 Test Ehc: Vertical hammer 13
7.1 Test apparatus 13
7.2 Height of fall 13
Annex A (normative) Shapes of striking elements 14
Annex B (normative) Procedure for the calibration of spring hammers 17
B.1 Principle of calibration 17
B.2 Construction of the calibration device 17
B.3 Method of calibration of the calibration device 17
B.4 Use of the calibration device 18
Annex C (informative) Guidance notes 24
C.1 When is an impact test appropriate? 24
C.2 Choice of test apparatus 24

C.3 Choice of energy level 24
C.4 Information for testing 25
Annex D (informative) Example of pendulum hammer test apparatus 26
Annex E (informative) Example of spring hammer test apparatus 29
Bibliography 31

Figure 1 – Example sketch of a striking element 8
Figure 2 – Derivation of measuring point 12
Figure 3 – Shape of release head for 2 J 13
Figure A.1 – Example of a striking element for ≤ 1 J 14
Figure A.2 – Example of a striking element for 2 J 14
Figure A.3 – Example of a striking element for 5 J 15
Figure A.4 – Example of a striking element for 10 J 15
Figure A.5 – Example of a striking element for 20 J 16
Figure A.6 – Example of a striking element for 50 J 16
Figure B.1 – Calibration device 19
Figure B.2 – Pendulum "c" 20
Figure B.3 – Steel spring of pendulum "c" 20
Figure B.4 – Details of calibration device 21
Figure B.5 – Arrangement for the calibration of the calibration device 22
Figure B.6 – Division of scale plate "f" 23
Figure D.1 – Test apparatus 26
Figure D.2 – Striking element of the pendulum hammer for energies ≤ 1 J 27
Figure D.3 – Mounting fixture 27
Figure D.4 – Adapter for flush-type switches 28
Figure D.5 – Adapter for lamp holders 28
Figure E.1 – Spring hammer test apparatus 30

Table 1 – Coordinated characteristics of the striking elements 8
Table 2 – Height of fall 11
Table C.1 – Energy levels in joules 24
Table E.1 – Kinetic energy of striking element 29

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60068-2-75 edition 2.1 contains the second edition (2014-09) [documents 104/635/FDIS and 104/637/RVD] and its amendment 1 (2025-10) [documents 104/1106/FDIS and 104/1137/RVD]. The content of the corrigendum 1 of amendment 1 (2025-12) applies only to the French version.

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60068-2-75 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This second edition cancels and replaces the first edition, published in 1997, and constitutes a technical revision.

This edition includes the following significant technical change with respect to the previous edition:

– reconsideration of some values in Tables 1 and 2. Although some values are no longer recommended, they have been retained as alternatives for historical consistency purposes.

It has the status of:a basic safety publication in accordance with IEC Guide 104.

The text of this standard is based on the following documents:

FDIS	Report on voting
104/635/FDIS	104/637/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60068 series, published under the general title *Environmental testing*, can be found on the IEC website.

The committee has decided that the contents of this document and its amendment will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

INTRODUCTION

Mechanical impacts likely to stress electrotechnical equipment in service can be generated by hammers of various types. For standardization purposes, the results of such testing should not depend on the type of testing apparatus and therefore, the characteristics of the various types of test hammers described in this part of IEC 60068 are intended to be as close as practicable for the same severity level.

It is important to note that both Clause 3 and the test method selected from Clauses 4, 5, and 6 need to be complied with in order to satisfy the requirements of this International Standard.

The severity levels are, in general, taken from IEC 60721-1.

For coordination purposes, it has been necessary to change certain fundamental parameters of the previous tests Ef: Impact, pendulum hammer, and Eg: Impact, spring hammer. In all cases, both sets of parameters are shown at the appropriate places in the text. Although some values are no longer recommended, they have been retained as alternatives for historical consistency purposes. This is because they have application in certain industries as historic comparators.

1 Scope

This part of IEC 60068 provides three standardized and coordinated test methods for determining the ability of a specimen to withstand specified severities of impact. It is used, in particular, to demonstrate an acceptable level of robustness when assessing the safety of a product and is primarily intended for the testing of electrotechnical items. It consists of the application to the specimen of a prescribed number of impacts defined by their impact energy and applied in the prescribed directions.

This part of IEC 60068 covers energy levels ranging from 0,14 J (joules) to 50 J (joules).

Three types of test apparatus are applicable to perform these tests. Annex C provides some guidance as to this aspect.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 60721-1, *Classification of environmental conditions – Part 1: Environmental parameters and their severities*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

IEC Guide 108, *Guidelines for ensuring the coherency of IEC publications – Application of horizontal standards*

ISO 48-4, *Rubber, vulcanized or thermoplastic - Determination of hardness*

ISO 1052, *Steels for general engineering purposes*

ISO 2039-2, *Plastics – Determination of hardness – Part 2: Rockwell hardness*

ISO 2041, *Vibration and shock and condition monitoring – Vocabulary*

ISO 2768-1, *General tolerances – Part 1: Tolerances for linear and angular dimensions without individual tolerances indications*

~~ISO 6508 (all parts), *Metallic materials – Rockwell hardness test*~~

ISO 6508-1, *Metallic materials - Rockwell hardness test - Part 1: Test method*

Bibliography

ISO 1098, *Veneer plywood for general use – General requirements*
(withdrawn)

_____

CONTENTS

FOREWORD 3
INTRODUCTION 5
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Provisions common to all hammer test methods 7
4.1 Severities 7
4.1.1 General 7
4.1.2 Impact energy value 7
4.1.3 Number of impacts 7
4.2 Test apparatus 8
4.2.1 Description 8
4.2.2 Mounting 9
4.3 Preconditioning 9
4.4 Initial measurements 9
4.5 Testing 9
4.5.1 General 9
4.5.2 Attitudes and impact locations 9
4.5.3 Preparation of the specimen 9
4.5.4 Operating mode and functional monitoring 9
4.6 Recovery 10
4.7 Final measurements 10
4.8 Information to be given in the relevant specification 10
5 Test Eha: Pendulum hammer 10
5.1 Test apparatus 10
5.1.1 General 10
5.1.2 Test apparatus for severities not exceeding 1 J 11
5.1.3 Test apparatus for severities of 2 J and above 11
5.2 Height of fall 11
5.3 Testing 11
6 Test Ehb: Spring hammer 12
6.1 Test apparatus 12
6.2 Influence of earth's gravity 13
6.3 Calibration 13
7 Test Ehc: Vertical hammer 13
7.1 Test apparatus 13
7.2 Height of fall 13
Annex A (normative) Shapes of striking elements 14
Annex B (normative) Procedure for the calibration of spring hammers 17
B.1 Principle of calibration 17
B.2 Construction of the calibration device 17
B.3 Method of calibration of the calibration device 17
B.4 Use of the calibration device 18
Annex C (informative) Guidance notes 24
C.1 When is an impact test appropriate? 24
C.2 Choice of test apparatus 24

C.3 Choice of energy level 24
C.4 Information for testing 25
Annex D (informative) Example of pendulum hammer test apparatus 26
Annex E (informative) Example of spring hammer test apparatus 29
Bibliography 31

Figure 1 – Example sketch of a striking element 8
Figure 2 – Derivation of measuring point 12
Figure 3 – Shape of release head for 2 J 13
Figure A.1 – Example of a striking element for ≤ 1 J 14
Figure A.2 – Example of a striking element for 2 J 14
Figure A.3 – Example of a striking element for 5 J 15
Figure A.4 – Example of a striking element for 10 J 15
Figure A.5 – Example of a striking element for 20 J 16
Figure A.6 – Example of a striking element for 50 J 16
Figure B.1 – Calibration device 19
Figure B.2 – Pendulum "c" 20
Figure B.3 – Steel spring of pendulum "c" 20
Figure B.4 – Details of calibration device 21
Figure B.5 – Arrangement for the calibration of the calibration device 22
Figure B.6 – Division of scale plate "f" 23
Figure D.1 – Test apparatus 26
Figure D.2 – Striking element of the pendulum hammer for energies ≤ 1 J 27
Figure D.3 – Mounting fixture 27
Figure D.4 – Adapter for flush-type switches 28
Figure D.5 – Adapter for lamp holders 28
Figure E.1 – Spring hammer test apparatus 30

Table 1 – Coordinated characteristics of the striking elements 8
Table 2 – Height of fall 11
Table C.1 – Energy levels in joules 24
Table E.1 – Kinetic energy of striking element 29

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60068-2-75 edition 2.1 contains the second edition (2014-09) [documents 104/635/FDIS and 104/637/RVD] and its amendment 1 (2025-10) [documents 104/1106/FDIS and 104/1137/RVD]. The content of the corrigendum 1 of amendment 1 (2025-12) applies only to the French version.

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 60068-2-75 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This second edition cancels and replaces the first edition, published in 1997, and constitutes a technical revision.

This edition includes the following significant technical change with respect to the previous edition:

– reconsideration of some values in Tables 1 and 2. Although some values are no longer recommended, they have been retained as alternatives for historical consistency purposes.

It has the status of:a basic safety publication in accordance with IEC Guide 104.

The text of this standard is based on the following documents:

FDIS	Report on voting
104/635/FDIS	104/637/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60068 series, published under the general title *Environmental testing*, can be found on the IEC website.

The committee has decided that the contents of this document and its amendment will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

INTRODUCTION

Mechanical impacts likely to stress electrotechnical equipment in service can be generated by hammers of various types. For standardization purposes, the results of such testing should not depend on the type of testing apparatus and therefore, the characteristics of the various types of test hammers described in this part of IEC 60068 are intended to be as close as practicable for the same severity level.

It is important to note that both Clause 3 and the test method selected from Clauses 4, 5, and 6 need to be complied with in order to satisfy the requirements of this International Standard.

The severity levels are, in general, taken from IEC 60721-1.

For coordination purposes, it has been necessary to change certain fundamental parameters of the previous tests Ef: Impact, pendulum hammer, and Eg: Impact, spring hammer. In all cases, both sets of parameters are shown at the appropriate places in the text. Although some values are no longer recommended, they have been retained as alternatives for historical consistency purposes. This is because they have application in certain industries as historic comparators.

1 Scope

This part of IEC 60068 provides three standardized and coordinated test methods for determining the ability of a specimen to withstand specified severities of impact. It is used, in particular, to demonstrate an acceptable level of robustness when assessing the safety of a product and is primarily intended for the testing of electrotechnical items. It consists of the application to the specimen of a prescribed number of impacts defined by their impact energy and applied in the prescribed directions.

This part of IEC 60068 covers energy levels ranging from 0,14 J (joules) to 50 J (joules).

Three types of test apparatus are applicable to perform these tests. Annex C provides some guidance as to this aspect.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 60721-1, *Classification of environmental conditions – Part 1: Environmental parameters and their severities*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

IEC Guide 108, *Guidelines for ensuring the coherency of IEC publications – Application of horizontal standards*

ISO 48-4, *Rubber, vulcanized or thermoplastic - Determination of hardness*

ISO 1052, *Steels for general engineering purposes*

ISO 2039-2, *Plastics – Determination of hardness – Part 2: Rockwell hardness*

ISO 2041, *Vibration and shock and condition monitoring – Vocabulary*

ISO 2768-1, *General tolerances – Part 1: Tolerances for linear and angular dimensions without individual tolerances indications*

ISO 6508-1, *Metallic materials - Rockwell hardness test - Part 1: Test method*

Bibliography

ISO 1098, *Veneer plywood for general use – General requirements*
(withdrawn)

_____