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Connectors for electrical and electronic equipment – Tests and measurements – Part 1: ~~General~~ Generic specification

IEC 60512-1:2018-10 RLV(en)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 1: ~~General~~ Generic specification

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60512-1 has been prepared by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

This fifth edition cancels and replaces the fourth edition, published in 2001. It constitutes a technical revision.

This edition includes the following main technical changes with respect to the previous edition:

– in Clause 3, only terms relating to the testing are defined, and IEC 61076-1 is referred to for terms of connectors.
– Clause 4 (Numbering of tests and measurement specification) is added.
– Subclause 5.1.2 (Calibration) is added.
– in Clause 6 (Test), test procedure follows IEC 60068-1.

This standard shall be used in conjunction with IEC 60512-1-101 and relevant part(s) of series IEC 60512. Part 60512-1-100 provides the list of the existing test and measuring methods published within series IEC 60512.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
48B/2667/FDIS	48B/2684/RVD

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

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

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

A list of all parts in the IEC 60512 series, published under the general title *Connectors for electrical and electronic equipment – Tests and measurements*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 1: ~~General~~ Generic specification

~~1 General~~

1 Scope ~~and object~~

~~This part of IEC 60512 is intended to be used as a basic specification. It contains basic test methods and procedures which, when required by the detail specification, are used for testing connectors within the scope of technical committee 48. They may also be used for similar devices when specified in a detail specification.~~

~~The object of this standard is to establish test methods and measurement procedures for use in specifications for connectors.~~

~~This standard is to be used in conjunction with the generic, sectional and detail specification which will select and prescribe the tests to be used, the required degree of severity for each of them and the permissible performance limits. The detail specification will also specify the deviations in procedure, which may be inevitable when applying a test to the type of component under consideration, and it will further specify any special procedures which may be required.~~

~~In the event of conflict between this basic specification and any individual component specification, the requirements of the component specification will apply.~~

~~NOTE 1 RF connectors will not be dealt with by this technical committee as they will be covered by technical committee 46, together with r.f. cables.~~

~~NOTE 2 Sockets for components such as crystals or electronic tubes will be considered in co-operation with the relevant technical committee.~~

~~NOTE 3 Safety requirements for switches will not be developed by this technical committee as they are covered by subcommittee 23J.~~

This part of IEC 60512 is intended to be used as a basis for tests and measurements specifications for electrical connectors. It provides guidance and reference for tests and measurements within the IEC 60512 series.

It includes the description and the practice of the various phases of tests and measurements (preparation, tests and measurements, requirements, documentation), in addition to basic terms and definitions applicable to any part of the IEC 60512 series.

This document is used in conjunction with IEC 60512-1-101 to establish uniform detail tests and measurements specifications.

Detail tests and measurements specifications are applicable to electrical connectors and their components (e.g. connector inserts, connector housings, locking mechanisms, contacts and terminations) within the scope of technical committee 48. They may also be used for similar devices when specified in a detail product specification.

Detail tests and measurements specifications are used in conjunction with detail product specifications which prescribe the tests to be used, the required degree of severity for each of them and the permissible performance limits. The detail product specification also specifies

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the deviations in procedures, which may be required when applying a test to the type of connector or its component under consideration, and it further specifies any special procedures which may be required.

NOTE RF and fibre optical connectors are not dealt with by subcommittee 48B, however, hybrid connectors which additionally employ RF and/or fibre optic contacts, are handled by SC 48B in cooperation with TC 46 and/or TC 86.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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:~~1988~~ 2013, *Environmental testing – Part 1: General and guidance*

IEC 60352-1:1997, *Solderless connections – Part 1: Wrapped connections – General requirements, test methods and practical guidance*

IEC 60352-2:2006, *Solderless connections – Part 2: Crimped connections – General requirements, test methods and practical guidance*
IEC 60352-2:2006/AMD1:2013

IEC 60352-3:1993, *Solderless connections – Part 3: Solderless accessible insulation displacement connections – General requirements, test methods and practical guidance*

IEC 60352-4:1994, *Solderless connections – Part 4: Solderless non-accessible insulation displacement connections – General requirements, test methods and practical guidance*
IEC 60352-4:1994/AMD1:2000

IEC 60352-5:2012, *Solderless connections – Part 5: Press-in connections – General requirements, test methods and practical guidance*

IEC 60352-6:1997, *Solderless connections – Part 6: Insulation piercing connections – General requirements, test methods and practical guidance*

IEC 60352-7:2002, *Solderless connections – Part 7: Spring clamp connections – General requirements, test methods and practical guidance*

IEC 60352-8:2011, *Solderless connections – Part 8: Compression mount connections – General requirements, test methods and practical guidance*

IEC 60512-1-100, *Connectors for electronic equipment – Tests and measurements – Part 1-100: General – Applicable publications*

IEC 60512-1-101, *Connectors for electronic equipment – Tests and measurements – Part 1-101:Blank detail specification*

IEC 61076-1, *Connectors for electronic equipment – Product requirements – Part 1:Generic specification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61076-1 as well as the following apply.

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ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

1.3.1
family
group of electromechanical components which predominantly display a particular physical characteristic and/or fulfil a specific function

Example – Family: connectors

1.3.2
sub-family
group of electromechanical components derived by further subdivision of a family and having similar application features

Example – Sub-family: rectangular connectors

1.3.3
type and style
the definitions for "type" and "style", referring to a particular component, are given in the detail specification

Examples – Type: rectangular multipole connectors with blade contacts.

Style: rectangular multipole connectors with blade contacts, housing and contact configuration.

1.3.4
basic specification
specification which is applicable to all electromechanical components or a large group thereof

1.3.5
generic specification
specification which is applicable to a family of electromechanical components

1.3.6
sectional specification
specification which is applicable to a sub-family of electromechanical components

1.3.7
blank detail specification
while not being in themselves a specification level, blank detail specifications may be provided for the guidance of those concerned with the preparation of detail specifications

1.3.8
detail specification
specification which is derived from a sectional specification. It covers a particular component or a group of related components. It describes that component or group of components, including all necessary values and characteristics, and gives the inspection requirements and appropriate references to the generic or sectional specification

1.3.9
inspection (test) lot
specified quantity of identical electromechanical components presented together for testing in accordance with the relevant test schedule

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~~**1.3.10**~~
~~**test specimen**~~
~~single electromechanical component to be tested in accordance with the procedure laid down in this standard~~

~~**1.3.11**~~
~~**test**~~
~~complete series of operations covered by any one heading and normally consisting of the following:~~

~~– pre-conditioning (where required);~~

~~– initial measurement (where required);~~

~~– conditioning;~~

~~– recovery (where required);~~

~~– final examination and measurements~~

3.1
ambient temperature
temperature of the air in free air conditions at such a distance from the specimen that the effect of the dissipation is negligible

Note 1 to entry: In practice, the ambient temperature is taken as the average of temperatures measured at a number of points in a horizontal plane situated between 0 mm and 50 mm below the specimen at half the distance between the specimen and the wall of the chamber, or at 1 m distance from the specimen, whichever is less. Suitable precautions should be taken to avoid heat radiation affecting these measurements.

[SOURCE: IEC 60068-1: 2013, 3.9.2]

3.2
combined test
test during which a specimen is subjected simultaneously to two or more environmental influences

Note 1 to entry: Tests with simultaneous influence of a) temperature and humidity; b) temperature, humidity and specific (including chemically active) medium; and c) temperature and solar radiation are not related to combined tests.

Note 2 to entry: Combined tests, as a rule, are used to provide simultaneous climatic and mechanical influences.

Note 3 to entry: Measurements are usually taken at the start and at the end of the test.

[SOURCE: IEC 60068-1:2013, 3.14]

3.3
conditioning
exposure of a specimen to environmental conditions~~, including electrical load,~~ in order to determine the effect of such conditions on the specimen

[SOURCE: IEC 60068-1:2013, 3.3, modified: title changed to "conditioning" from original "testing".]

3.4
free air conditions
conditions within an infinite space where the movement of the air is affected only by the heat-dissipating specimen itself

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3.5
lower limiting temperature
LLT
minimum temperature of a connector as defined by the climatic category assigned by the manufacturer in which a connector is intended to operate

Note 1 to entry: The LLT of a connector is covered by the climatic category as defined in IEC 60068-1, together with the ULT and the duration of the damp heat test.

[SOURCE: IEC 61984:2008, 3.16]

3.6
maximum continuous operating temperature
COT_{max}
maximum ambient temperature at which the connector can be fully (on all poles) and continuously (without interruption) loaded at its rated current, without mechanical and/or electrical deterioration, i.e. without exceeding its upper limiting temperature (ULT)

3.7
minimum continuous operating temperature
COT_{min}
minimum ambient temperature at which the connector can be still continuously operated within its ratings, without mechanical and/or electrical deterioration

3.8
pre-conditioning
treatment of a specimen ~~for the purpose~~ with the object of removing, or partly counteracting, the effects of its previous history

Note 1 to entry: Where pre-conditioning is called for, it is the first process in the test procedure.

Note 2 to entry: Pre-conditioning may be affected by subjecting the specimen to climatic, electrical, or any other conditions required by the relevant specification in order that the properties of the specimen may be stabilized before measurement and test.

[SOURCE: IEC 60068-1:2013, 3.2]

3.9
rated current
current value assigned by the manufacturer, which the connector can carry continuously (without interruption) and simultaneously through all its contacts wired with the largest specified conductor, preferably at an ambient temperature of 40 °C, without the upper limiting temperature being exceeded

Note 1 to entry: If other ambient temperature values are used for the definition of the rated current, the manufacturer should state in the technical documentation, the ambient temperature on which the rating is based, with reference, if appropriate, to the derating curve defined in IEC 60512, test 5b.

[SOURCE IEC 61984:2008, 3.27]

3.10
rated temperature
temperature value assigned by the manufacturer, which is based on maximum continuous operating temperature (COT_{max}) and minimum continuous operating temperature (COT_{min})

3.11
rated voltage
value of voltage assigned by the manufacturer to the connector and to which operation and performance characteristics are referred

Note 1 to entry: A connector may have more than one rated voltage value.

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Note 2 to entry: Rated voltage is based on clearance and creepage distance, refer IEC 60664-1.

[SOURCE: IEC 61984:2008, 3.27]

3.12
recovery
treatment of a specimen, after conditioning, in order ~~to stabilize its~~ that the properties of the specimen may be stabilized before measurement

[SOURCE: IEC 60068-1:2013, 3.4]

3.13
sequence of tests
sequence in which the specimen is exposed successively to two or more test environments

Note 1 to entry: The durations of intervals between the exposures to different test environments are such that they normally have no significant effect on the specimen.

Note 2 to entry: Pre-conditioning and recovery periods are usually performed between the different exposures.

Note 3 to entry: Measurements are usually taken before and after each exposure, the final measurement of one test being the initial measurement of the next.

[SOURCE: IEC 60068-1: 2013,3.16]

3.14
specimen
connector(s), mated set of connectors, component(s) and/or connector assembly(ies) to be tested

Note 1 to entry: The detail product specification describes what is intended as a specimen.

3.15
thermal stability
state when the temperatures of all parts of the specimen are within 3 K, or as otherwise prescribed by the relevant specification, of their final temperature

Note 1 to entry: Stability is defined as when three consecutive values of temperature raise, taken at 5 min intervals, do not differ by more than 3 K of each other.

[SOURCE: IEC 60068-1:2013, 3.11]

3.16
upper limiting temperature
ULT
maximum temperature in the connector as outcome (sum) of the ambient temperature and the temperature rise due to current flow, at which the connector is intended to be still operable

Note 1 to entry: At ambient temperature equal to ULT, the available temperature rise due to current flow is zero, thus the current carrying capacity of the connector is zero.

Note 2 to entry: The ULT of a connector is covered by the climatic category as defined in IEC 60068-1, together with the LLT and the duration of the damp heat test.

[SOURCE: IEC 61984:2008, 3.15]

4 Numbering of tests and measurements specification

The former test method standards were published in booklets, with several related tests in one document, while the present test method standards are published as individual documents.

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The individual tests in the former booklets were identified by test number (e.g. test 1a, 1b, 1c etc.).

The present test method standards are assigned a specification number as IEC 60512 with two dash numbers (e.g. IEC 60512-1-1). The first dash number denotes the part which constitutes a group of tests and measurements of similar kind (see list of existing parts below). and the second dash number denotes the test within that part. The second dash number (-1,-2,-3, etc.) corresponds to alphabet (a, b, c, etc.) letter used in the former booklet-published standards, for example: IEC 60512-1-1 identifies IEC 60512, test 1a. This test number 1a corresponds to 1a of the old 60512 booklet.

The new, individual test method standards are published with numbers and titles such as the following:

IEC 60512-4-1

Connectors for electrical and electronic equipment –

Tests and measurements –

Part 4-1: Voltage stress tests – Test 4a: Voltage proof

In order to avoid confusion with numbers, the letters l (lowercase L as in Lima) and o (lowercase O as in Oscar) shall not be used.

If necessary, a further part may be added for a new test group.

The current denomination of the existing parts of IEC 60512 is as follows:

Part 1: General examination
Part 2: Electrical continuity and contact resistance tests
Part 3: Insulation tests
Part 4: Voltage stress tests
Part 5: Current-carrying capacity tests
Part 6: Dynamic stress tests
Part 7: Impact tests (free connectors)
Part 8: Static load tests (fixed connectors)
Part 9: Endurance tests
Part 10: Overload tests
Part 11: Climatic tests
Part 12: Soldering tests
Part 13: Mechanical operation tests
Part 14: Sealing tests
Part 15: Connector tests (mechanical)
Part 16: Mechanical tests on contacts and terminations
Part 17: Cable clamping tests
Part 18: Explosion hazard tests
Part 19: Chemical resistance tests
Part 20: Fire hazard tests
Part 21: RF resistance tests
Part 22: Capacitance tests
Part 23: Screening and filtering tests

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Part 24: Magnetic interference tests

Part 25: Signal integrity tests

Part 26: Measurement setup, test and reference arrangement and measurements for connectors according to IEC 60603-7

Part 27: Signal integrity tests up to 500 MHz on IEC 60603-7 series connectors

Part 28: Signal integrity tests up to 1 000 MHz on IEC 60603-7 and IEC 61076-3 series connectors

Part 29: Signal integrity tests up to 500 MHz on M12 style connectors

Part 99: Test schedule for engaging and separating connectors under electrical load

5 Preparation for test (description and instructions)

5.1 Test apparatus

5.1.1 Test equipment, fixture and gauge

Details of equipment, fixture, gauge, etc., relating to the test shall be described.

5.1.2 Calibration

All test equipment shall be calibrated, at least, at the interval specified by the manufacturer or at an interval related to its intended function and use, determined by the testing laboratory.

Measurement standards used in the calibration of test equipment shall be calibrated and traceable to national standards and shall be used for calibration purposes only. The calibration (or verification) interval shall be in accordance with the manufacturer's specifications. The calibration (or verification) shall be repeated whenever the standard has been subjected to some form of abuse that may affect the fitness of a standard.

The tolerances, i.e., the calibration acceptance criteria, required for the measurement shall be considered when selecting test equipment for measurements. The precision and accuracy tolerances provided by the test equipment manufacturer for use in calibration may be accepted.

See Bibliography for detailed information related to calibration systems and measurement uncertainty.

5.2 Preparation of specimens

Unless otherwise specified, the specimens shall be provided in the "as manufactured" condition. Care shall be taken to ensure that no part of the surface to be tested becomes contaminated, particularly by contact with fingers, during the preparation and handling of the specimen.

Specimens shall be equipped with their normal accessories, mounted as specified in the detail product specification.

5.3 Wiring

Where wiring of test specimens is required, the detail product specification shall contain information suitable to comply with the selected methods of test.

If specimens are not delivered with wire conductors already assembled, the wire conductors shall be connected to the associated parts in accordance with the manufacturer's instructions and using the manufacturer's recommended tooling. If no specific manufacturer's instructions are provided, then refer to IEC 60352 series, or related specifications.

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5.4 Mounting of specimen

When mounting is required in a test, unless otherwise specified, the connectors shall be rigidly mounted on a metal plate, a printed board or to specified accessories, whichever is applicable, using the normal mounting method, fixing devices or panel cut-out as laid down in the detail product specification.

6 ~~Standard conditions for testing~~ Test (description and instructions)

6.1 Tests and measurements

Unless otherwise specified, all tests shall be carried out under standard atmospheric conditions for ~~testing~~ tests and measurements (15 °C to 35 °C ambient temperature, 25 % to 75 % RH, 86 kPa to 106 kPa atmospheric pressure) as specified in IEC 60068-1.

~~The ambient temperature and relative humidity at which the measurements are made shall be stated in the test report.~~

~~The test shall be carried out with specimens as received from the supplier. In no case shall the contact parts be cleaned or otherwise prepared prior to test, unless explicitly required.~~

~~In cases of dispute about the test results, the test shall be carried out at one of the referee conditions of IEC 60068-1.~~

The test shall be carried out with specimens in the "as manufactured condition" unless otherwise specified in the detail specification. In no case shall the contact parts be cleaned or otherwise prepared prior to test, unless explicitly required.

A test normally consists of the following:

a) pre-conditioning (where required)

   before measurements are made, the test specimens shall be pre-conditioned under standard atmospheric conditions for testing, for a time as specified in the detail product specification;

b) initial measurement (where required)

   before a test is made, initial measurements (usually serving as reference for subsequent test failure criteria) shall be done in accordance with the detail product specification;

c) tests

   the specimens shall be subjected to environmental conditions, such as temperature, humidity, vibration, shock, etc., for a specified period of time according to the detail product specification.

In addition to environmental conditions, the specimens shall be subjected to the tests (e.g. mechanical operation tests, electrical overload tests, soldering tests, etc.) according to the relevant part(s) of IEC 60512 under test conditions and severity, as specified in the detail product specification;

d) recovery (where required)

   after the conditioning period and before making the final measurement, the specimens shall be allowed to stabilize for a specified period or recovery time at ambient temperature and humidity, at which the measurements are to be made unless otherwise specified in the detail product specification;

e) final examination and measurements

   after recovery time, the final measurement shall be performed in accordance with the detail product specification.

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~~3 Testing~~

6.2 Test sequences

The test sequences are as described in the sectional or detail product specifications. The test numbers used in this document have no significance with respect to test sequence; they are given to identify a test for reference purposes. In order to avoid duplication and costly measurements, the sectional or detail product specification will also select and prescribe those measurements to be performed out of a list of measurements contained in the various test method documents.

6.3 Combined tests

Combined tests are specified. Additional combinations of tests ~~should~~ shall be avoided, unless essential to a specific application.

6.4 ~~Repetition of~~ Dimensional measurements

Repetition of identical dimensional measurements ~~is to~~ shall be avoided unless required to prove that all aspects of manufacturing, tooling or processes are satisfactory (for example, parts produced from multi cavity tooling).

6.5 Alternative test methods

The test methods given in this document ~~are~~ shall be the preferred methods but they are not necessarily the only ones which ~~can~~ may be used. In case of dispute, however, the specified method shall be used as the referee method.

Where approval procedures are involved and alternative methods are employed, it is the responsibility of the manufacturer to satisfy the authority granting approval that any alternative methods ~~which he may use~~ proposed will give results equivalent to those obtained by the methods specified.

~~4 Classification of non-conforming components~~

~~4.1 Major non-conformance~~

~~A major non-conformance is any non-conformance of a component with specified requirements that:~~

~~a) is likely to result in premature major failure of the component, and/or~~

~~b) reduces materially its ability to perform its intended function.~~

~~4.2 Minor non-conformance~~

~~A minor non-conformance is a shortcoming that does not reduce materially the ability of a component to perform its intended function, or is a minor departure from specifications, having little or no effect on the ability of a component to perform its intended function, for example, scratches, surface finish, minor corrosion, discoloration, etc.~~

~~A minor non-conformance is not a cause for rejection but it shall be recorded in the test report.~~

7 Requirements

Requirements shall be specified in the detail product specification.

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8 Documentation

Documentation shall contain the following details:

a) title of test;
b) specimen description, including fixturing if applicable (photographs are recommended);
c) test equipment used;
d) test and procedure number;
e) test condition and severity;
f) values and observations;
g) name and address of test laboratory;
h) name of responsible person or staff and date of test.

Test equipment identification with date of last and next calibration as well as the temperature and humidity of laboratory room where the measurements were taken shall be available upon request.

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ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

IECEE CTL-OP 111, *Requirements for Traceability of Calibrations and Calibration Intervals*

ISO 3534-2:2006, *Statistics – Vocabulary and symbols – Part 2: Applied statistics*

ISO 5725-1, *Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results – Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

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IEC 60512-1

Edition 5.0 2018-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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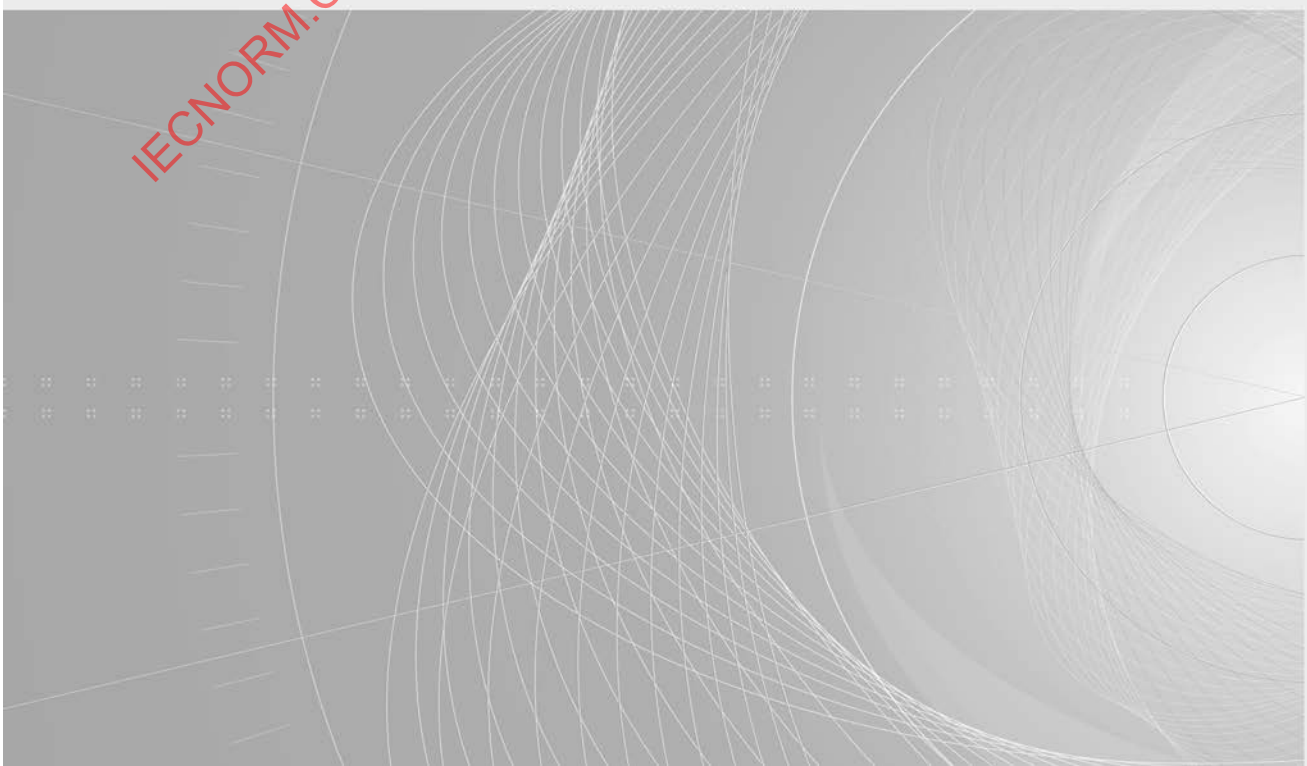
Connectors for electrical and electronic equipment – Tests and measurements – Part 1: Generic specification

Connecteurs pour équipements électriques et électroniques – Essais et mesures – Partie 1: Spécification générique



IEC 60512-1:2018-10(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 1: Generic specification

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.
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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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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International Standard IEC 60512-1 has been prepared by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

This fifth edition cancels and replaces the fourth edition, published in 2001. It constitutes a technical revision.

This edition includes the following main technical changes with respect to the previous edition:

– in Clause 3, only terms relating to the testing are defined, and IEC 61076-1 is referred to for terms of connectors.
– Clause 4 (Numbering of tests and measurement specification) is added.
– Subclause 5.1.2 (Calibration) is added.
– in Clause 6 (Test), test procedure follows IEC 60068-1.

This standard shall be used in conjunction with IEC 60512-1-101 and relevant part(s) of series IEC 60512. Part 60512-1-100 provides the list of the existing test and measuring methods published within series IEC 60512.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
48B/2667/FDIS	48B/2684/RVD

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

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

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

A list of all parts in the IEC 60512 series, published under the general title *Connectors for electrical and electronic equipment – Tests and measurements*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 1: Generic specification

1 Scope

This part of IEC 60512 is intended to be used as a basis for tests and measurements specifications for electrical connectors. It provides guidance and reference for tests and measurements within the IEC 60512 series.

It includes the description and the practice of the various phases of tests and measurements (preparation, tests and measurements, requirements, documentation), in addition to basic terms and definitions applicable to any part of the IEC 60512 series.

This document is used in conjunction with IEC 60512-1-101 to establish uniform detail tests and measurements specifications.

Detail tests and measurements specifications are applicable to electrical connectors and their components (e.g. connector inserts, connector housings, locking mechanisms, contacts and terminations) within the scope of technical committee 48. They may also be used for similar devices when specified in a detail product specification.

Detail tests and measurements specifications are used in conjunction with detail product specifications which prescribe the tests to be used, the required degree of severity for each of them and the permissible performance limits. The detail product specification also specifies the deviations in procedures, which may be required when applying a test to the type of connector or its component under consideration, and it further specifies any special procedures which may be required.

NOTE RF and fibre optical connectors are not dealt with by subcommittee 48B, however, hybrid connectors which additionally employ RF and/or fibre optic contacts, are handled by SC 48B in cooperation with TC 46 and/or TC 86.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60352-1:1997, *Solderless connections – Part 1: Wrapped connections – General requirements, test methods and practical guidance*

IEC 60352-2:2006, *Solderless connections – Part 2: Crimped connections – General requirements, test methods and practical guidance*
IEC 60352-2:2006/AMD1:2013

IEC 60352-3:1993, *Solderless connections – Part 3: Solderless accessible insulation displacement connections – General requirements, test methods and practical guidance*

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IEC 60352-4:1994, *Solderless connections – Part 4: Solderless non-accessible insulation displacement connections – General requirements, test methods and practical guidance*
IEC 60352-4:1994/AMD1:2000

IEC 60352-5:2012, *Solderless connections – Part 5: Press-in connections – General requirements, test methods and practical guidance*

IEC 60352-6:1997, *Solderless connections – Part 6: Insulation piercing connections – General requirements, test methods and practical guidance*

IEC 60352-7:2002, *Solderless connections – Part 7: Spring clamp connections – General requirements, test methods and practical guidance*

IEC 60352-8:2011, *Solderless connections – Part 8: Compression mount connections – General requirements, test methods and practical guidance*

IEC 60512-1-100, *Connectors for electronic equipment – Tests and measurements – Part 1-100: General – Applicable publications*

IEC 60512-1-101, *Connectors for electronic equipment – Tests and measurements – Part 1-101:Blank detail specification*

IEC 61076-1, *Connectors for electronic equipment – Product requirements – Part 1:Generic specification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61076-1 as well as the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
ambient temperature
temperature of the air in free air conditions at such a distance from the specimen that the effect of the dissipation is negligible

Note 1 to entry: In practice, the ambient temperature is taken as the average of temperatures measured at a number of points in a horizontal plane situated between 0 mm and 50 mm below the specimen at half the distance between the specimen and the wall of the chamber, or at 1 m distance from the specimen, whichever is less. Suitable precautions should be taken to avoid heat radiation affecting these measurements.

[SOURCE: IEC 60068-1: 2013, 3.9.2]

3.2
combined test
test during which a specimen is subjected simultaneously to two or more environmental influences

Note 1 to entry: Tests with simultaneous influence of a) temperature and humidity; b) temperature, humidity and specific (including chemically active) medium; and c) temperature and solar radiation are not related to combined tests.

Note 2 to entry: Combined tests, as a rule, are used to provide simultaneous climatic and mechanical influences.

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Note 3 to entry: Measurements are usually taken at the start and at the end of the test.

[SOURCE: IEC 60068-1:2013, 3.14]

3.3
conditioning
exposure of a specimen to environmental conditions in order to determine the effect of such conditions on the specimen

[SOURCE: IEC 60068-1:2013, 3.3, modified: title changed to "conditioning" from original "testing".]

3.4
free air conditions
conditions within an infinite space where the movement of the air is affected only by the heat-dissipating specimen itself

3.5
lower limiting temperature
LLT
minimum temperature of a connector as defined by the climatic category assigned by the manufacturer in which a connector is intended to operate

Note 1 to entry: The LLT of a connector is covered by the climatic category as defined in IEC 60068-1, together with the ULT and the duration of the damp heat test.

[SOURCE: IEC 61984:2008, 3.16]

3.6
maximum continuous operating temperature
COT_{max}
maximum ambient temperature at which the connector can be fully (on all poles) and continuously (without interruption) loaded at its rated current, without mechanical and/or electrical deterioration, i.e. without exceeding its upper limiting temperature (ULT)

3.7
minimum continuous operating temperature
COT_{min}
minimum ambient temperature at which the connector can be still continuously operated within its ratings, without mechanical and/or electrical deterioration

3.8
pre-conditioning
treatment of a specimen with the object of removing, or partly counteracting, the effects of its previous history

Note 1 to entry: Where pre-conditioning is called for, it is the first process in the test procedure.

Note 2 to entry: Pre-conditioning may be affected by subjecting the specimen to climatic, electrical, or any other conditions required by the relevant specification in order that the properties of the specimen may be stabilized before measurement and test.

[SOURCE: IEC 60068-1:2013, 3.2]

3.9
rated current
current value assigned by the manufacturer, which the connector can carry continuously (without interruption) and simultaneously through all its contacts wired with the largest specified conductor, preferably at an ambient temperature of 40 °C, without the upper limiting temperature being exceeded

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Note 1 to entry: If other ambient temperature values are used for the definition of the rated current, the manufacturer should state in the technical documentation, the ambient temperature on which the rating is based, with reference, if appropriate, to the derating curve defined in IEC 60512, test 5b.

[SOURCE IEC 61984:2008, 3.27]

3.10
rated temperature
temperature value assigned by the manufacturer, which is based on maximum continuous operating temperature (COT_{max}) and minimum continuous operating temperature (COT_{min})

3.11
rated voltage
value of voltage assigned by the manufacturer to the connector and to which operation and performance characteristics are referred

Note 1 to entry: A connector may have more than one rated voltage value.

Note 2 to entry: Rated voltage is based on clearance and creepage distance, refer IEC 60664-1.

[SOURCE: IEC 61984:2008, 3.27]

3.12
recovery
treatment of a specimen, after conditioning, in order that the properties of the specimen may be stabilized before measurement

[SOURCE: IEC 60068-1:2013, 3.4]

3.13
sequence of tests
sequence in which the specimen is exposed successively to two or more test environments

Note 1 to entry: The durations of intervals between the exposures to different test environments are such that they normally have no significant effect on the specimen.

Note 2 to entry: Pre-conditioning and recovery periods are usually performed between the different exposures.

Note 3 to entry: Measurements are usually taken before and after each exposure, the final measurement of one test being the initial measurement of the next.

[SOURCE: IEC 60068-1: 2013,3.16]

3.14
specimen
connector(s), mated set of connectors, component(s) and/or connector assembly(ies) to be tested

Note 1 to entry: The detail product specification describes what is intended as a specimen.

3.15
thermal stability
state when the temperatures of all parts of the specimen are within 3 K, or as otherwise prescribed by the relevant specification, of their final temperature

Note 1 to entry: Stability is defined as when three consecutive values of temperature raise, taken at 5 min intervals, do not differ by more than 3 K of each other.

[SOURCE: IEC 60068-1:2013, 3.11]

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3.16
upper limiting temperature
ULT
maximum temperature in the connector as outcome (sum) of the ambient temperature and the temperature rise due to current flow, at which the connector is intended to be still operable

Note 1 to entry: At ambient temperature equal to ULT, the available temperature rise due to current flow is zero, thus the current carrying capacity of the connector is zero.

Note 2 to entry: The ULT of a connector is covered by the climatic category as defined in IEC 60068-1, together with the LLT and the duration of the damp heat test.

[SOURCE: IEC 61984:2008, 3.15]

4 Numbering of tests and measurements specification

The former test method standards were published in booklets, with several related tests in one document, while the present test method standards are published as individual documents.

The individual tests in the former booklets were identified by test number (e.g. test 1a, 1b, 1c etc.).

The present test method standards are assigned a specification number as IEC 60512 with two dash numbers (e.g. IEC 60512-1-1). The first dash number denotes the part which constitutes a group of tests and measurements of similar kind (see list of existing parts below). and the second dash number denotes the test within that part. The second dash number (-1,-2,-3, etc.) corresponds to alphabet (a, b, c, etc.) letter used in the former booklet-published standards, for example: IEC 60512-1-1 identifies IEC 60512, test 1a. This test number 1a corresponds to 1a of the old 60512 booklet.

The new, individual test method standards are published with numbers and titles such as the following:

IEC 60512-4-1

Connectors for electrical and electronic equipment –

Tests and measurements –

Part 4-1: Voltage stress tests – Test 4a: Voltage proof

In order to avoid confusion with numbers, the letters l (lowercase L as in Lima) and o (lowercase O as in Oscar) shall not be used.

If necessary, a further part may be added for a new test group.

The current denomination of the existing parts of IEC 60512 is as follows:

Part 1: General examination

Part 2: Electrical continuity and contact resistance tests

Part 3: Insulation tests

Part 4: Voltage stress tests

Part 5: Current-carrying capacity tests

Part 6: Dynamic stress tests

Part 7: Impact tests (free connectors)

Part 8: Static load tests (fixed connectors)

Part 9: Endurance tests

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Part 10: Overload tests

Part 11: Climatic tests

Part 12: Soldering tests

Part 13: Mechanical operation tests

Part 14: Sealing tests

Part 15: Connector tests (mechanical)

Part 16: Mechanical tests on contacts and terminations

Part 17: Cable clamping tests

Part 18: Explosion hazard tests

Part 19: Chemical resistance tests

Part 20: Fire hazard tests

Part 21: RF resistance tests

Part 22: Capacitance tests

Part 23: Screening and filtering tests

Part 24: Magnetic interference tests

Part 25: Signal integrity tests

Part 26: Measurement setup, test and reference arrangement and measurements for connectors according to IEC 60603-7

Part 27: Signal integrity tests up to 500 MHz on IEC 60603-7 series connectors

Part 28: Signal integrity tests up to 1 000 MHz on IEC 60603-7 and IEC 61076-3 series connectors

Part 29: Signal integrity tests up to 500 MHz on M12 style connectors

Part 99: Test schedule for engaging and separating connectors under electrical load

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5 Preparation for test (description and instructions)

5.1 Test apparatus

5.1.1 Test equipment, fixture and gauge

Details of equipment, fixture, gauge, etc., relating to the test shall be described.

5.1.2 Calibration

All test equipment shall be calibrated, at least, at the interval specified by the manufacturer or at an interval related to its intended function and use, determined by the testing laboratory.

Measurement standards used in the calibration of test equipment shall be calibrated and traceable to national standards and shall be used for calibration purposes only. The calibration (or verification) interval shall be in accordance with the manufacturer's specifications. The calibration (or verification) shall be repeated whenever the standard has been subjected to some form of abuse that may affect the fitness of a standard.

The tolerances, i.e., the calibration acceptance criteria, required for the measurement shall be considered when selecting test equipment for measurements. The precision and accuracy tolerances provided by the test equipment manufacturer for use in calibration may be accepted.

See Bibliography for detailed information related to calibration systems and measurement uncertainty.

5.2 Preparation of specimens

Unless otherwise specified, the specimens shall be provided in the “as manufactured” condition. Care shall be taken to ensure that no part of the surface to be tested becomes contaminated, particularly by contact with fingers, during the preparation and handling of the specimen.

Specimens shall be equipped with their normal accessories, mounted as specified in the detail product specification.

5.3 Wiring

Where wiring of test specimens is required, the detail product specification shall contain information suitable to comply with the selected methods of test.

If specimens are not delivered with wire conductors already assembled, the wire conductors shall be connected to the associated parts in accordance with the manufacturer’s instructions and using the manufacturer’s recommended tooling. If no specific manufacturer’s instructions are provided, then refer to IEC 60352 series, or related specifications.

5.4 Mounting of specimen

When mounting is required in a test, unless otherwise specified, the connectors shall be rigidly mounted on a metal plate, a printed board or to specified accessories, whichever is applicable, using the normal mounting method, fixing devices or panel cut-out as laid down in the detail product specification.

6 Test (description and instructions)

6.1 Tests and measurements

Unless otherwise specified, all tests shall be carried out under standard atmospheric conditions for tests and measurements (15 °C to 35 °C ambient temperature, 25 % to 75 % RH, 86 kPa to 106 kPa atmospheric pressure) as specified in IEC 60068-1.

The test shall be carried out with specimens in the “as manufactured condition” unless otherwise specified in the detail specification. In no case shall the contact parts be cleaned or otherwise prepared prior to test, unless explicitly required.

A test normally consists of the following:

a) pre-conditioning (where required)

   before measurements are made, the test specimens shall be pre-conditioned under standard atmospheric conditions for testing, for a time as specified in the detail product specification;

b) initial measurement (where required)

   before a test is made, initial measurements (usually serving as reference for subsequent test failure criteria) shall be done in accordance with the detail product specification;

c) tests

   the specimens shall be subjected to environmental conditions, such as temperature, humidity, vibration, shock, etc., for a specified period of time according to the detail product specification.

In addition to environmental conditions, the specimens shall be subjected to the tests (e.g. mechanical operation tests, electrical overload tests, soldering tests, etc.) according to the relevant part(s) of IEC 60512 under test conditions and severity, as specified in the detail product specification;

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d) recovery (where required)

after the conditioning period and before making the final measurement, the specimens shall be allowed to stabilize for a specified period or recovery time at ambient temperature and humidity, at which the measurements are to be made unless otherwise specified in the detail product specification;

e) final examination and measurements

after recovery time, the final measurement shall be performed in accordance with the detail product specification.

6.2 Test sequences

The test sequences are as described in the sectional or detail product specifications. The test numbers used in this document have no significance with respect to test sequence; they are given to identify a test for reference purposes. In order to avoid duplication and costly measurements, the sectional or detail product specification will also select and prescribe those measurements to be performed out of a list of measurements contained in the various test method documents.

6.3 Combined tests

Combined tests are specified. Additional combinations of tests shall be avoided, unless essential to a specific application.

6.4 Dimensional measurements

Repetition of identical dimensional measurements shall be avoided unless required to prove that all aspects of manufacturing, tooling or processes are satisfactory (for example, parts produced from multi cavity tooling).

6.5 Alternative test methods

The test methods given in this document shall be the preferred methods but they are not necessarily the only ones which may be used. In case of dispute, however, the specified method shall be used as the referee method.

Where approval procedures are involved and alternative methods are employed, it is the responsibility of the manufacturer to satisfy the authority granting approval that any alternative methods proposed will give results equivalent to those obtained by the methods specified.

7 Requirements

Requirements shall be specified in the detail product specification.

8 Documentation

Documentation shall contain the following details:

a) title of test;

b) specimen description, including fixturing if applicable (photographs are recommended);

c) test equipment used;

d) test and procedure number;

e) test condition and severity;

f) values and observations;

g) name and address of test laboratory;

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h) name of responsible person or staff and date of test.

Test equipment identification with date of last and next calibration as well as the temperature and humidity of laboratory room where the measurements were taken shall be available upon request.

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IEC 61984:2008, *Connectors – Safety requirements and tests*

IEC Guide 115, *Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

IECEE CTL-OP 111, *Requirements for Traceability of Calibrations and Calibration Intervals*

ISO 3534-2:2006, *Statistics – Vocabulary and symbols – Part 2: Applied statistics*

ISO 5725-1, *Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions*

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SOMMAIRE

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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CONNECTEURS POUR ÉQUIPEMENTS ÉLECTRIQUES ET ÉLECTRONIQUES – ESSAIS ET MESURES –

Partie 1: Spécification générique

AVANT-PROPOS

1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 60512-1 a été établie par le sous-comité 48B: Connecteurs électriques, du comité d'études 48 de l'IEC: Connecteurs électriques et structures mécaniques pour les équipements électriques et électroniques.

Cette cinquième édition annule et remplace la quatrième édition, parue en 2001. Elle constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

– dans l'Article 3, définition uniquement des termes relatifs aux essais, et référence à l'IEC 61076-1 pour les termes relatifs aux connecteurs;

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– ajout de l'Article 4 (Numérotation des essais et spécification de mesure);

– ajout du paragraphe 5.1.2 (Etalonnage);

– dans l'Article 6 (Essais), mode opératoire calqué sur l'IEC 60068-1.

La présente norme doit être utilisée conjointement avec l'IEC 60512-1-101 et la ou les parties pertinentes de la série IEC 60512. La Partie 60512-1-100 donne la liste des méthodes d'essai et de mesure existantes, publiées dans la série IEC 60512.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
48B/2667/FDIS	48B/2684/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Les futures normes de cette série porteront dorénavant le nouveau titre général cité ci-dessus. Le titre des normes existant déjà dans cette série sera mis à jour lors de la prochaine édition.

Une liste de toutes les parties de la série IEC 60512, publiées sous le titre général *Connecteurs pour équipements électriques et électroniques – Essais et mesures*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous «http://webstore.iec.ch» dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

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CONNECTEURS POUR ÉQUIPEMENTS ÉLECTRIQUES ET ÉLECTRONIQUES – ESSAIS ET MESURES –

Partie 1: Spécification générique

1 Domaine d'application

La présente partie de l'IEC 60512 est destinée à être utilisée comme une base pour les spécifications des essais et mesures relatifs aux connecteurs électriques. Elle donne des recommandations et des références pour les essais et mesures au sein de la série IEC 60512.

Elle inclut la description et l'organisation des différentes phases des essais et mesures (préparation, essais et mesures, exigences, documentation), ainsi que les termes et définitions de base applicables à une quelconque partie de la série IEC 60512.

Le présent document est utilisé conjointement avec l'IEC 60512-1-101 pour déterminer des spécifications particulières uniformes des essais et mesures.

Les spécifications particulières des essais et mesures s'appliquent aux connecteurs électriques et à leurs composants, relevant du domaine d'application du comité d'études 48 (par exemple isolants de connecteurs, boîtiers de connecteurs, mécanismes de verrouillage, contacts et sorties). Elles peuvent également être utilisées pour des dispositifs similaires, lorsque cela est spécifié dans la spécification particulière d'un produit.

Les spécifications particulières des essais et mesures sont utilisées conjointement avec les spécifications particulières de produit qui prescrivent les essais à utiliser, le degré de sévérité exigé pour chacun d'eux et les limites de performance admises. La spécification particulière du produit spécifie aussi les écarts dans les modes opératoires, qui peuvent être exigés lors de la réalisation d'un essai sur le type de connecteur à l'étude, ou sur l'un de ses composants. Elle spécifie en outre un quelconque mode opératoire spécifique qui peut être exigé.

NOTE Les connecteurs RF et à fibres optiques ne relèvent pas du domaine d'application du sous-comité 48B. Cependant, les connecteurs hybrides qui comprennent entre autres des contacts RF et/ou à fibres optiques relèvent du domaine d'application du SC 48B, en coopération avec le TC 46 et/ou le TC 86.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60068-1:2013, *Essais d'environnement – Partie 1: Généralités et lignes directrices*

IEC 60352-1:1997, *Connexions sans soudure – Partie 1: Connexions enroulées – Règles générales, méthodes d'essai et guide pratique*

IEC 60352-2:2006, *Connexions sans soudure – Partie 2: Connexions serties – Exigences générales, méthodes d'essai et guide pratique*
IEC 60352-2:2006/AMD1:2013

IEC 60352-3:1993, *Connexions sans soudure – Partie 3: Connexions autodénudantes accessibles sans soudure – Règles générales, méthodes d'essai et guide pratique*

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IEC 60352-4:1994, *Connexions sans soudure – Partie 4: Connexions autodénudantes, non accessibles sans soudure – Règles générales, méthodes d'essai et guide pratique*
IEC 60352-4:1994/AMD1:2000

IEC 60352-5:2012, *Connexions sans soudure – Partie 5: Connexions insérées à force – Exigences générales, méthodes d'essai et guide pratique*

IEC 60352-6:1997, *Connexions sans soudure – Partie 6: Connexions à percement d'isolant – Règles générales, méthodes d'essai et guide pratique*

IEC 60352-7:2002, *Connexions sans soudure – Partie 7: Connexions à ressort – Règles générales, méthodes d'essai et guide pratique*

IEC 60352-8:2011, *Connexions sans soudure – Partie 8: Connexions par compression – Exigences générales, méthodes d'essai et guide pratique*

IEC 60512-1-100, *Connecteurs pour équipements électroniques – Essais et mesures – Partie 1-100: Généralités – Publications applicables*

IEC 60512-1-101, *Connecteurs pour équipements électroniques – Essais et mesures – Partie 1-101: Spécification particulière cadre*

IEC 61076-1, *Connecteurs pour équipements électroniques – Exigences de produit – Partie 1: Spécification générique*

3 Termes et définitions

Pour les besoins du présent document, les termes et définitions de l'IEC 61076-1 ainsi que les suivants s'appliquent.

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse http://www.electropedia.org/
- ISO Online browsing platform: disponible à l'adresse http://www.iso.org/obp

3.1
température ambiante
température de l'air, dans les conditions d'air calme, à une distance du spécimen telle que l'effet de la dissipation est négligeable

Note 1 à l'article: En pratique, la température ambiante est prise comme la moyenne des températures mesurées en un certain nombre de points d'un plan horizontal situé entre 0 mm et 50 mm en dessous du spécimen, à mi-distance entre le spécimen et la paroi de la chambre ou à une distance de 1 m du spécimen, si cette dernière distance est inférieure. Il convient de prendre les précautions convenables pour éviter que le rayonnement de chaleur n'affecte ces mesures.

[SOURCE: IEC 60068-1: 2013, 3.9.2]

3.2
essai combiné
essais au cours desquels un spécimen est soumis simultanément à deux ou plus de deux influences d'environnement

Note 1 à l'article: Les essais avec influence simultanée de a) température et d'humidité, b) de température, d'humidité et d'un milieu spécifique (y compris chimiquement actif) et c) de température et de rayonnement solaire ne s'apparentent pas aux essais combinés.

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