



**NSAI**  
Standards

Irish Standard  
I.S. EN IEC 60512-11-1:2019

Connectors for electrical and electronic  
equipment - Tests and measurements -  
Part 11-1: Climatic tests - Test 11a -  
Climatic sequence

**I.S. EN IEC 60512-11-1:2019**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN IEC 60512-11-1:2019 is the adopted Irish version of the European Document EN IEC 60512-11-1:2019, Connectors for electrical and electronic equipment - Tests and measurements - Part 11-1: Climatic tests - Test 11a - Climatic sequence

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EUROPEAN STANDARD

**EN IEC 60512-11-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2019

ICS 31.220.01

Supersedes EN 60512-11-1:1999

English Version

**Connectors for electrical and electronic equipment - Tests and measurements - Part 11-1: Climatic tests - Test 11a - Climatic sequence  
(IEC 60512-11-1:2019)**

Connecteurs pour équipements électriques et électroniques  
- Essais et mesures - Partie 11-1: Essais climatiques -  
Essai 11a - Séquence climatique  
(IEC 60512-11-1:2019)

Elektrisch-mechanische Bauelemente für elektronische  
Einrichtungen - Mess- und Prüfverfahren - Teil 11-1:  
Klimatische Prüfungen - Prüfung 11a: Klimafolge  
(IEC 60512-11-1:2019)

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

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## **EN IEC 60512-11-1:2019 (E)**

### **European foreword**

The text of document 48B/2688/CDV, future edition 2 of IEC 60512-11-1, prepared by SC 48B "Electrical connectors" of IEC/TC 48 "Electrical connectors and mechanical structures for electrical and electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60512-11-1:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-03-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-06-20

This document supersedes EN 60512-11-1:1999.

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The text of the International Standard IEC 60512-11-1:2019 was approved by CENELEC as a European Standard without any modification.

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-1	2013	Environmental testing - Part 1: General and guidance	EN 60068-1	2014
IEC 60068-2-1	2007	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	2007
IEC 60068-2-2	2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	2007
IEC 60068-2-13	1983	Basic environmental testing procedures - Part 2-13: Tests - Test M: Low air pressure	EN 60068-2-13	1999
IEC 60068-2-30	-	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	-
IEC 60068-2-61	1991	Environmental testing - Part 2-61: Test methods - Test Z/ABDM: Climatic sequence	EN 60068-2-61	1993
IEC 60512-1	-	Connectors for electrical and electronic equipment - Tests and measurements - Part 1: Generic specification	EN IEC 60512-1	-
IEC 60512-1-101	-	Connectors for electronic equipment - Tests and measurements - Part 1-101: Blank detail specification	-	-
IEC 60512-1-1	-	Connectors for electronic equipment - Tests and measurements - Part 1-1: General examination - Test 1a: Visual examination	EN 60512-1-1	-
IEC 60512-2-1	-	Connectors for electronic equipment - Tests and measurements - Part 2-1: Electrical continuity and contact resistance tests - Test 2a: Contact resistance - Millivolt level method	EN 60512-2-1	-

## EN IEC 60512-11-1:2019 (E)

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60512-2-2	-	Connectors for electronic equipment - Tests and measurements - Part 2-2: Electrical continuity and contact resistance tests - Test 2b: Contact resistance - Specified test current method	EN 60512-2-2	-
IEC 60512-3-1	-	Connectors for electronic equipment - Tests and measurements - Part 3-1: Insulation tests - Test 3a: Insulation resistance	EN 60512-3-1	-
IEC 60512-4-1	-	Connectors for electronic equipment - Tests and measurements - Part 4-1: Voltage stress tests - Test 4a: Voltage proof	EN 60512-4-1	-
IEC 60512-11-9	-	Connectors for electronic equipment - Tests and measurements - Part 11-9: Climatic tests - Test 11i: Dry heat	EN 60512-11-9	-
IEC 60512-11-10	-	Connectors for electronic equipment - Tests and measurements - Part 11-10: Climatic tests - Test 11j: Cold	EN 60512-11-10	-
IEC 60512-11-11	-	Connectors for electronic equipment - Tests and measurements - Part 11-11: Climatic tests - Test 11k: Low air pressure	EN 60512-11-11	-
IEC 60512-11-12	-	Connectors for electronic equipment - Tests and measurements - Part 11-12: Climatic tests - Test 11m: Damp heat, cyclic	EN 60512-11-12	-
IEC 60512-13-1	-	Connectors for electronic equipment - Tests and measurements - Part 13-1: Mechanical operation tests - Test 13a: Engaging and separating forces	EN 60512-13-1	-
IEC 60512-13-2	-	Connectors for electronic equipment - Tests and measurements - Part 13-2: Mechanical operation tests - Test 13b: Insertion and withdrawal forces	EN 60512-13-2	-
IEC 60512-17-1	-	Connectors for electronic equipment - Tests and measurements - Part 17-1: Cable clamping tests - Test 17a: Cable clamp robustness	EN 60512-17-1	-
IEC 60512-17-2	-	Connectors for electronic equipment - Tests and measurements - Part 17-2: Cable clamping tests - Test 17b: Cable clamp resistance to cable rotation	EN 60512-17-2	-
IEC 60512-17-3	-	Connectors for electronic equipment - Tests and measurements - Part 17-3: Cable clamping tests - Test 17c: Cable clamp resistance to cable pull (tensile)	EN 60512-17-3	-
IEC 60512-17-4	-	Connectors for electronic equipment - Tests and measurements - Part 17-4: Cable clamping tests - Test 17d: Cable clamp resistance to cable torsion	EN 60512-17-4	-





**IEC 60512-11-1**

Edition 2.0 2019-05

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**

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**Connectors for electrical and electronic equipment – Tests and measurements –  
Part 11-1: Climatic tests – Test 11a – Climatic sequence**

**Connecteurs pour équipements électriques et électroniques – Essais et mesures –  
Partie 11-1: Essais climatiques – Essai 11a – Séquence climatique**





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**IEC 60512-11-1**

Edition 2.0 2019-05

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**

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**Connectors for electrical and electronic equipment – Tests and measurements –  
Part 11-1: Climatic tests – Test 11a – Climatic sequence**

**Connecteurs pour équipements électriques et électroniques – Essais et mesures –  
Partie 11-1: Essais climatiques – Essai 11a – Séquence climatique**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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### **CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –**

#### **Part 11-1: Climatic tests – Test 11a – Climatic sequence**

#### 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.
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International Standard IEC 60512-11-1 has been prepared by sub-committee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

This second edition cancels and replaces the first edition published in 1995. This edition constitutes a technical revision.

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

- a) formatting and clause numbering according to the latest IEC template and the latest IEC 60512-1-101 blank detail (tests and measurements) specification;
- b) update and expansion of normative references;
- c) better specification of various details regarding tests.

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

CDV	Report on voting
48B/2688/CDV	48B/2722/RVC

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.

## INTRODUCTION

This part of IEC 60512 provides a standard test method for electrical connectors based upon IEC 60068-2-61, which is referenced as a basis.

The value of a sequence of climatic tests, particularly for the testing of components, has been witnessed a long time ago by the inclusion of a “climatic sequence” in IEC 60068-1 (in the 2013 edition, it is covered in Clause 6, with guidance in Annex B).

With the increasing importance of the IEC Quality Assessment System for Electronic Components (IECQ) it had become necessary to define that test sequence more precisely than could be done therein, with the object of providing for satisfactory reproducibility of the test.

IEC 60068-2-61 was then established by IEC TC 104, describing in detail a composite test specifying a “climatic sequence” for specimens of products, primarily components, that is based on Clause 6 of IEC 60068-1:2013, and it includes guidance in informative annexes for specification writers and those performing the test.

Test Z/ABDM of IEC 60068-2-61 is a “composite test” as defined in IEC 60068-1 rather than a “sequence” as defined in the same standard. Because of the well-established use of “sequence” in references to Clause 6 of IEC 60068-1:2013, TC 104 decided that “sequence” should have continued to be used in referring to the operations in this composite test. This document also adheres to this decision.

This part of IEC 60512 tailors the above mentioned general-purpose composite climatic test to the specific needs of electrical connectors.

# **CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –**

## **Part 11-1: Climatic tests – Test 11a – Climatic sequence**

### **1 Scope**

This part of IEC 60512, when required by the detail (product) specification, is used for testing connectors within the scope of IEC technical committee 48. This test may also be used for similar devices (i.e. when the degradation mechanisms are the same) when specified in a detail (product) specification.

The object of this test is to define a standard test method to assess the ability of connectors to function in a specified manner, in a specified environment which might be encountered during normal use, including storage.

This document provides a standard composite test method for determining the suitability of connectors when subjected to environmental conditions consisting of a sequence of temperature, humidity and, where required, low air pressure environmental stresses.

The order of application of the stresses and the conditions for the change from one step to the next have been chosen to accelerate, amplify and allow potential interactions of degradation mechanisms of the same type as those observed under natural climatic conditions.

In this composite test, connector specimens are exposed to environmental tests in a standard order and categorized according to their climatic category as assigned by the detail (product) specification, except that the third group of digits is used as an indication of the number of cycles in step 5 of the damp heat cyclic test according to IEC 60512-11-12.

Where any modification is necessary, the relevant connector detail (product) specification provides the necessary information for each step in the method.

This test is frequently specified to follow other tests involving mechanical stress, for example tests for robustness of terminations, solderability, shock and vibration, as a means of determining whether the sealing of the specimen has been damaged.

### **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 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-13:1983, *Basic environmental testing procedures – Part 2-13: Tests – Test M: Low air pressure*



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