Connectors for electrical and electronic equipment - Tests and measurements - Part 9-5: Endurance tests - Test 9e: Current loading, cyclic

EESTI STANDARDIKESKUS
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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 60512-9-5:2020 sisaldab Euroopa standardi EN IEC 60512-9-5:2020 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 60512-9-5:2020 consists of the English text of the European standard EN IEC 60512-9-5:2020.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 31.07.2020.	Date of Availability of the European standard is 31.07.2020.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 31.220.01

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60512-9-5

July 2020

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Supersedes EN 60512-9-5:2010 and all of its amendments and corrigenda (if any)

English Version

Connectors for electrical and electronic equipment - Tests and measurements - Part 9-5: Endurance tests - Test 9e: Current loading, cyclic (IEC 60512-9-5:2020)

Connecteurs pour équipements électriques et électroniques - Essais et mesures - Partie 9-5: Essais d'endurance - Essai 9e: Charge en courant, essai cyclique (IEC 60512-9-5:2020)

Steckverbinder für elektrische und elektronische Einrichtungen - Mess- und Prüfverfahren - Teil 9-5: Dauerprüfungen - Prüfung 9e: Strombelastung, zyklisch (IEC 60512-9-5:2020)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 48B/2803/FDIS, future edition 2 of IEC 60512-9-5, 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 60512-9-5:2020.

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) 2021-04-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-07-14

This document supersedes EN 60512-9-5:2010 and all of its amendments and corrigenda (if any).

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The text of the International Standard IEC 60512-9-5:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60352-1:1997	NOTE	Harmonized as EN 60352-1:1997 (not modified)
IEC 60352-2:2006	NOTE	Harmonized as EN 60352-2:2006 (not modified)
IEC 60352-3:1993	NOTE	Harmonized as EN 60352-3:1994 (not modified)
IEC 60352-4:1994	NOTE	Harmonized as EN 60352-4:1994 (not modified)
IEC 60352-5:2012	NOTE	Harmonized as EN 60352-5:2012 (not modified)
IEC 60352-6:1997	NOTE	Harmonized as EN 60352-6:1997 (not modified)
IEC 60352-7:2002	NOTE	Harmonized as EN 60352-7:2002 (not modified)
IEC 60352-8:2011	NOTE	Harmonized as EN 60352-8:2011 (not modified)
IEC 60512-14-2:2006	NOTE	Harmonized as EN 60512-14-2:2006 (not modified)
IEC 60512-14-4:2006	NOTE	Harmonized as EN 60512-14-4:2006 (not modified)
IEC 60512-14-5:2006	NOTE	Harmonized as EN 60512-14-5:2006 (not modified)
IEC 60512-14-6:2006	NOTE	Harmonized as EN 60512-14-6:2006 (not modified)
IEC 60512-14-7:1997	NOTE	Harmonized as EN 60512-14-7:1998 (not modified)
IEC 60529:1989	NOTE	Harmonized as EN 60529:1991 (not modified)
IEC 60529:1989/A1:1999	NOTE	Harmonized as EN 60529:1991/A1:2000 (not modified)
IEC 60529:1989/A2:2013	NOTE	Harmonized as EN 60529:1991/A2:2013 (not modified)

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.

Publication	Year	Title	EN/HD	Year
IEC 60352	series	Solderless connections	EN 60352	series
IEC 60512-1	2018	Connectors for electrical and electronic equipment - Tests and measurements - Part 1: Generic specification	EN IEC 60512-1	2018
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	-
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 60512-2-6	-	Connectors for electronic equipment - Tests and measurements - Part 2-6: Electrical continuity and contact resistance tests - Test 2f: Housing (shell) electrical continuity	EN 60512-2-6	-
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 60512-9-5

Edition 2.0 2020-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Connectors for electrical and electronic equipment – Tests and measurements – Part 9-5: Endurance tests – Test 9e: Current loading, cyclic

Connecteurs pour équipements électriques et électroniques – Essais et mesures – Partie 9-5: Essais d'endurance – Essai 9e: Charge en courant, essai cyclique

IEC 60512-9-5:2020-06(en-fr)

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INTERNATIONAL STANDARD

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONTENTS

FOREWORD 3
INTRODUCTION 5
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Preparations 7
4.1 Test equipment 7
4.2 Preparation of specimens 7
4.3 Mounting of specimens 7
5 Test / measuring methods 7
5.1 Pre-conditioning 7
5.2 Initial measurements 7
5.3 Test 8
5.3.1 General 8
5.3.2 Method A 8
5.3.3 Method B 8
5.4 Recovery 9
5.5 Final measurements 9
6 Details to be specified 10
Bibliography 11

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 9-5: Endurance tests – Test 9e: Current loading, cyclic

FOREWORD

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International Standard IEC 60512-9-5 has been prepared by subcommittee 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 2010. This edition constitutes a technical revision.

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

- added method B and renamed the former test method as method A, to provide an alternative with more adjustable time "ON" and "OFF" for products with larger thermal mass;
- added introduction to provide background of this revision;

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

FDIS	Report on voting
48B/2803/FDIS	48B/2819/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.

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

The object of this document is to detail a standard method for subjecting solderless connections to a thermal stress conditioning by cyclic current loading, in order to verify the right combination of conductor material, termination material and tool application – if any is required, in view of any possible creep phenomena that might lead to a reduction of performance of the solderless connection.

Although requiring electric power to apply the specified current loading, this test is an endurance test by thermal conditioning, whose aim is to submit specimens of connectors using solderless connections or of solderless connections to a repeated cycling between ambient temperature (normal laboratory conditions) and the upper limiting temperature (ULT) specified for the connector or solderless connection, either by the detail product specification or the manufacturer specification, or by the default values provided in the relevant part of IEC 60352 series.

The way the solderless connection under test acts is affected both by the solderless termination design and material and the attached conductor size and material, as well as by any tool applied to produce the connection, with all relevant settings and accessories as specified for the particular combination of termination and conductor.

Time “ON” represents the “heating” interval necessary to reach the ULT from ambient temperature, time “OFF” represents the “cooling” interval, necessary to cool down the specimen to ambient temperature. The sum of these intervals represents a cycle. Due to the various nature of a solderless connection in terms of size and thermal inertia of the termination and of the attached conductor, the traditional method with fixed duty cycle duration it is not always suitable.

For this reason, two methods are now provided to perform this test:

– method A is the traditional one, with time “ON” of 45 min and time “OFF” of 15 min, that has proven suitable for small-sized solderless connections, e.g. connections employing conductors with cross-sectional area less than or equal to 10 mm^2. However, even in such cases, depending on the thermal mass of the termination or the conductor (e.g. for a crimped connection), method B may be preferable;

– method B is with time “ON” or time “OFF” to be determined experimentally by the first test cycle. Moreover, heating time by current load may be even abbreviated by increasing and controlling the current load, whereas cooling may be accelerated too, by forced air cooling. Because the number of repeated cycles is the primary factor affecting the severity of this test, long duration times at ULT (highest temperature) and ambient temperature (lowest temperature) may not be necessary for the purpose of this test. This method is suitable for large-sized solderless connections, e.g. connections employing conductors with cross-sectional area larger than 10 mm^2.