

## SLOVENSKI STANDARD SIST EN 61189-5-503:2017

01-oktober-2017

Preskusne metode za električne materiale, tiskane plošče ter druge povezovalne strukture in sestave - 5-503. del: Splošne preskusne metode za materiale in sestave - Preskušanje tiskanih vezij s prevodnimi anodnimi vlakni (CAF)

Test methods for electrical materials, printed boards and other interconnection structures and assemblies - Part 5-503: General test methods for materials and assemblies - Conductive Anodic Filaments (CAF) testing of circuit boards

# iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>SIST EN 61189-5-503:2017</u> https://standards.iteh.ai/catalog/standards/sist/74a8c25f-3ff3-4e44-8a7c-a221677b27c5/sist-en-61189-5-503-2017

Ta slovenski standard je istoveten z: EN 61189-5-503:2017

ICS:

31.180 Tiskana vezja (TIV) in tiskane Printed circuits and boards

plošče

SIST EN 61189-5-503:2017 en

SIST EN 61189-5-503:2017

# iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61189-5-503:2017 https://standards.iteh.ai/catalog/standards/sist/74a8c25f-3ff3-4e44-8a7c-a221677b27c5/sist-en-61189-5-503-2017 EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM EN 61189-5-503

August 2017

ICS 31.180

### **English Version**

Test methods for electrical materials, printed board and other interconnection structures and assemblies - Part 5-503: General test method for materials and assemblies - Conductive anodic filaments (CAF) testing of circuit boards (IEC 61189-5-503:2017)

Méthodes d'essai pour les matériaux électriques, les cartes imprimées et autres structures d'interconnexion et ensembles - Partie 5-503 : Méthodes d'essai générales pour les matériaux et les assemblages - Essais des filaments anodiques conducteurs (CAF) des cartes à circuit imprimé (IEC 61189-5-503:2017)

Prüfverfahren für Elektromaterialien, Leiterplatten und andere Verbindungsstrukturen und Baugruppen - Teil 5-503: Allgemeine Prüfverfahren für Materialien und Baugruppen - Leitfähige anodische Fasern (CAF), Prüfung für Leiterplatten (IEC 61189-5-503:2017)

### iTeh STANDARD PREVIEW

This European Standard was approved by CENELEC on 2017-06-26. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member catalog/standards/sist/74a8c25f-3ff3-4e44-8a7c-

a221677b27c5/sist-en-61189-5-503-2017
This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

#### EN 61189-5-503:2017

### **European foreword**

The text of document 91/1433/FDIS, future edition 1 of IEC 61189-5-503, prepared by IEC/TC 91 "Electronics assembly technology" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61189-5-503:2017.

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)	2018-03-26
•	latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-06-26

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

#### **Endorsement notice**

The text of the International Standard IEC 61189-5-503:2017 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 60068-3-4	(stand	Harmonized as EN 60068-3-4.
IEC 60068-3-5		EHarmonized as EN 60068-3-5. log/standards/sist/74a8c25f-3ff3-4e44-8a7c-
IEC 60721-1	1	Harmonized as EN 6072101.7
IEC 60721-2-1	NOTE	Harmonized as EN 60721-2-1.
IEC 60721-3-0	NOTE	Harmonized as EN 60721-3-0.

## Annex ZA

(normative)

# Normative references to international publications with their corresponding European publications

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

NOTE 1 When 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: <a href="https://www.cenelec.eu">www.cenelec.eu</a>.

www.cerielec.eu.				
<u>Publication</u>	<u>Year</u>	<u>Title</u>	EN/HD	<u>Year</u>
IEC 60068-1	2013	Environmental testing Part 1: General and guidance	EN 60068-1	2014
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 60068-2-38	-	Environmental testing Part 2-38: Tests - Test Z/AD: Composite temperature/humidity cyclic test	EN 60068-2-38	-
IEC 60068-2-66	-	Environmental testing Part 2-66: Test methods - Test Cx: Damp heat, steady state (unsaturated pressurized vapour)	EN 60068-2-66	-
IEC 60068-2-67	iTe	Environmental testing Part 2: Tests - Test Cy: Damp heat, steady state, accelerated test primarily intended for	EN 60068-2-67	-
IEC 60068-2-78	-	components Environmental testing S Part 2-78. Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60194	- https://ata	Printed board designsmanufacture and assembly reTerms and definitions 25f-3ff3-4	-	-
IPC-TM-650 No 2.6.14.1	- -	Electrochemical Migration Resistance Test		-
IPC-TM-650 No 2.6.25	-	Conductive Anodic Filament (CAF) Resistance Test: X-Y Axis	-	-

SIST EN 61189-5-503:2017

# iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61189-5-503:2017 https://standards.iteh.ai/catalog/standards/sist/74a8c25f-3ff3-4e44-8a7c-a221677b27c5/sist-en-61189-5-503-2017



IEC 61189-5-503

Edition 1.0 2017-05

# INTERNATIONAL STANDARD



Test methods for electrical materials, printed board and other interconnection structures and assemblies standards iteh.ai)
Part 5-503: General test method for materials and assemblies – Conductive anodic filaments (CAF) testing of circuit boards

https://standards.iteh.ai/catalog/standards/sist/74a8c25f-3ff3-4e44-8a7c-a221677b27c5/sist-en-61189-5-503-2017

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 31.180 ISBN 978-2-8322-4320-6

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

## CONTENTS

F	OREWO	RD	4
1	Scop	e	6
2	Norm	native references	6
3	Term	s and definitions	6
4	Testi	ng condition	7
	4.1	Standard condition	
	4.2	Judgment state	
5		imen	
-	5.1	Outline of CAF test vehicle design	
	5.1.1	_	
	5.1.2		
	5.2	CAF test board	
	5.2.1		
	5.2.2	•	
	5.3	Number of specimens	
6		oment/Apparatus or material	
•	6.1	Environmental test chamber	
	6.2		_
	6.3	Measuring equipment A. N. D.	13
	6.4	Current limiting resistorstandards.iteh.ai)	1 <i>0</i>
	6.5	Connecting wire	
	6.6	Other dedicated fixtures SIST EN 61189-5-503:2017	
7	Resi	stance measurement methodatalog/standards/sist/74a8c25f-3ff3-4c44-8a7c-	14
•	7.1	stance measurement methodatalog/standards/sist/74a8c25f-3ff3-4e44-8a7c- a221677b27c5/sist-en-61189-5-503-2017 Manual insulation resistance measurement method	14
	7.1	Automatic insulation resistance measurement method	
8		method	
Ü	8.1	Test method selection	
	8.2	Steady-state temperature and humidity test	
	8.2.1		
	8.2.2	•	
	8.3	Temperature and humidity (12 h + 12 h) cycle test	
	8.3.1	Object	
	8.3.2	•	
	8.3.3		
	8.4	Temperature and humidity cyclic test with and without low temperature	
		exposure	17
	8.4.1	Object	17
	8.4.2	Test condition	17
	8.5	Steady-state high temperature and high humidity (unsaturated pressurized vapour) test	17
	8.5.1	Object	17
	8.5.2	Test condition	18
9	Proc	edure	18
	9.1	Test specimen preparation	18
	9.1.1	General	
	9.1.2	Sample identification	18

9.1.3	Prescreen for opens and shorts	18
9.1.4	Cleaning	19
9.1.5	Connecting wire	19
9.1.6	Cleaning after attachment	19
9.1.7	Dry	
	econdition	
	est procedure	
9.3.1	Setting of the specimen	
9.3.2	Test voltage and measuring voltage	
9.3.3	Temperature and humidity condition at the start time of the test	
9.3.4	Measurement	
9.3.5	Procedure in test interruption	
9.3.6	End of test	
	sual inspection	
9.4.1	General	
9.4.2	Shape of electrochemical migration	
-	formative) Forms of electrochemical migration	
	xample of dendrite-shaped migration	
	AF (Example of migration along the glass fibre)	
ыынодгарпу	iTeh STANDARD PREVIEW	23
Figure 1 – S	chematic of in-line test comb, with possible failure site	8
Figure 2 – S	chematic of staggered test comb, with possible failure site	9
Figure 3 – M	lanhattan distance <u>SIST EN 61189-5-503:2017</u>	9
Figure 4 – S	https://standards.iteh.ai/catalog/standards/sist/74a8c25f-3ff3-4e44-8a7c- chematic section of yla pair-with blas 2216 / 627c3/sist-en-61189-5-503-2017	10
Figure 5 – F	xample of inner layer via pads and layer patterns	10
	xample of no inner layer via pads and layer patterns	
_	nsulation evaluation pattern for through-holes and via holes	
_	· · · · · · · · · · · · · · · · · · ·	
-	ayouts of the two versions of the CAF test boards	
	leasurement with insulation resistance meter	
	Temperature and humidity in a test	
	Example which is generated on the board surface	
Figure A.2 –	Example of CAF	22
Table 1 – Di	mension of insulation evaluation pattern for through-holes	11
Table 2 – Te	est structures A1 through A4 design rules	12
Table 3 – Te	est structures B1 through B4 design rules	13
	est condition	
	umber of cycles of the test	
	est condition	
	est condition (IEC 60068-2-66)	17

#### – 4 –

### INTERNATIONAL ELECTROTECHNICAL COMMISSION

## TEST METHODS FOR ELECTRICAL MATERIALS, PRINTED BOARD AND OTHER INTERCONNECTION STRUCTURES AND ASSEMBLIES –

# Part 5-503: General test method for materials and assemblies – Conductive anodic filaments (CAF) testing of circuit boards

#### **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. TANDARD PREVIEW
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) 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.

International Standard IEC 61189-5-503 been prepared by IEC technical committee 91: Electronics assembly technology.

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

FDIS	Report on voting
91/1433/FDIS	91/1443/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.

IEC 61189-5-503:2017 © IEC 2017

- 5 -

A list of all parts in the IEC 61189 series, published under the general title *Test methods for electrical materials, printed boards and other interconnection structures and assemblies*, 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.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

# iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 61189-5-503:2017 https://standards.iteh.ai/catalog/standards/sist/74a8c25f-3ff3-4e44-8a7c-a221677b27c5/sist-en-61189-5-503-2017