SVENSK STANDARD

SS-EN IEC 62506, utg 2:2024

2024-06-19

COMMENTED VERSION

Metoder för accelererad provning av produkter

Methods for product accelerated testing

En så kallad ”Commented Version” (CMV) innehåller både den fastställda IEC-standarden och en kommenterad och ändringsmarkerad standard. Alla tillägg och borttagningar sedan den tidigare utgåvan är markerade med färg. Med en CMV sparar du mycket tid när du ska identifiera och förklara aktuella ändringar i standarden. SEK Svensk Elstandard kan bara ge ut CMV i de fall den finns tillgänglig från IEC.

IEC 62506

Edition 2.0 2023-11
COMMENTED VERSION

INTERNATIONAL STANDARD

colour
inside

Methods for product accelerated testing

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 03.120.01, 21.020

ISBN 978-2-8322-7828-4

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METHODS FOR PRODUCT ACCELERATED TESTING

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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This commented version (CMV) of the official standard IEC 62506:2023 edition 2.0 allows the user to identify the changes made to the previous IEC 62506:2013 edition 1.0. Furthermore, comments from IEC TC 56 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 62506 has been prepared by IEC technical committee 56: Dependability. It is an International Standard.

This second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

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

a) references have been updated;

b) symbols have been revised;

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INTRODUCTION

Many reliability or failure investigation test methods have been developed and most of them are currently in use. These methods are used to either determine product reliability or to identify potential product failure modes, and have been considered effective as demonstrations of reliability:

- fixed duration,
- sequential probability ratio,
- reliability growth tests,
- tests to failure, etc.

Such tests, although very useful, are usually lengthy, especially when the product reliability that has to be demonstrated is high. The reduction in time-to-market periods as well as competitive product cost, increase the need for efficient and effective accelerated testing. Here, the tests are shortened through the application of increased stress levels or by increasing the speed of application of repetitive stresses, thus facilitating a quicker assessment and growth of product reliability through failure mode discovery and mitigation.

There are two distinctly different approaches to reliability activities:

- the first approach verifies, through analysis and testing, that there are no potential failure modes in the product that are likely to be activated during the expected life time of the product under the expected operating conditions and usage profile;
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Accelerated testing is a method appropriate for both cases, but used quite differently. The first approach is associated with qualitative accelerated testing, where the goal is identification of potential faults that eventually ~~might~~ can result in product field failures. The second approach is associated with quantitative accelerated testing where the product reliability may be estimated based on the results of accelerated simulation testing that can be related back to the use of the environment and usage profile.

Accelerated testing can be applied to multiple levels of items containing hardware ~~or~~ and software. Different types of reliability testing, such as fixed duration, sequential test-to-failure, success test, reliability demonstration, or reliability growth~~/~~ or improvement tests can be candidates for accelerated methods. This document provides guidance on selected, commonly used accelerated test types. This document should be used in conjunction with statistical test plan standards such as IEC 61123, IEC 61124, IEC 61649 and IEC 61710.

The relative merits of various methods and their individual or combined applicability in evaluating a given system or item, should be reviewed by the product design team (including ~~dependability~~ reliability engineering) prior to selection of a specific test method or a combination of methods. For each method, consideration should also be given to the test time, results produced, credibility of the results, data required to perform meaningful analysis, life cycle cost impact, complexity of analysis and other identified factors.

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METHODS FOR PRODUCT ACCELERATED TESTING

1 Scope

This document provides guidance on the application of various accelerated test techniques for measurement or improvement of ~~product~~ item reliability. Identification of potential failure modes that ~~could~~ can be experienced in the use of ~~a product/~~ an item and their mitigation is instrumental to ensure dependability of an item.

The object of the methods is to either identify potential design weakness or provide information on item ~~dependability~~ reliability, or to achieve necessary reliability~~/~~ and availability improvement, all within a compressed or accelerated period of time. This document addresses accelerated testing of non-repairable and repairable systems. It can be used for probability ratio sequential tests, fixed duration tests and reliability improvement/growth tests, where the measure of reliability ~~may~~ can differ from the standard probability of failure occurrence.

This document also extends to present accelerated testing or production screening methods that would identify weakness introduced into the ~~product~~ item by manufacturing error, which ~~could~~ can compromise ~~product dependability~~ item reliability. Services and people are however not covered by this document.

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IEC 60050-192 – *International Electrotechnical Vocabulary (IEV) – Part 192: Dependability*, available at http://www.electropedia.org

~~IEC 60068 (all parts), *Environmental testing*~~

~~IEC 60300-3-1:2003, *Dependability management – Part 3-1: Application guide – Analysis techniques for dependability – Guide on methodology*~~

IEC 60300-3-5, *Dependability management – Part 3-5: Application guide – Reliability test conditions and statistical test principles*

IEC 60605-2, *Equipment reliability testing – Part 2: Design of test cycles*

IEC 60721 (all parts), *Classification of environmental conditions*

~~IEC 61014:2003, *Programmes for reliability growth*~~

IEC 61123:2019, *Reliability testing – Compliance test plans for success ratio*

IEC 61124:~~2012~~2023, *Reliability testing – Compliance tests for constant failure rate and constant failure intensity*

~~IEC 61163-2, *Reliability stress screening – Part 2: Electronic components*~~

~~IEC 61164:2004, *Reliability growth – Statistical test and estimation methods*~~

IEC 61649:2008, *Weibull analysis*

IEC 61709, ~~*Electronic*~~ *Electric components – Reliability – Reference conditions for failure rates and stress models for conversion*

IEC 61710, *Power law model – Goodness-of-fit tests and estimation methods*

~~IEC 62303, *Radiation protection instrumentation – Equipment for monitoring airborne tritium*~~

~~IEC/TR 62380, *Reliability data handbook – Universal model for reliability prediction of electronics components, PCBs and equipment*~~

IEC 62429, *Reliability growth – Stress testing for early failures in unique complex systems*

SEK SVENSK ELSTANDARD

SVENSK STANDARD

SS-EN IEC 62506, utg 2:2024

Fastställd	Sida	Ansvarig kommitté
2024-06-19	1 (94)	SEK TK 56

Metoder för accelererad provning av produkter

Methods for product accelerated testing

Som svensk standard gäller europastandarden EN IEC 62506:2023. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 62506:2023.

Nationellt förord

Europastandarden EN IEC 62506:2023

består av:

- **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
- **IEC 62506, Second edition, 2023 - Methods for product accelerated testing**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 62506, utg 1:2014 med eventuella tillägg, ändringar och rättelser gäller ej fr o m 2026-12-12.

ICS 03.120.01; 21.020.00

Denna standard är fastställd av SEK Svensk Elstandard,
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Telefon: 08 - 444 14 00.
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EUROPEAN STANDARD

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EN IEC 62506

December 2023

ICS 03.120.01; 21.020

Supersedes EN 62506:2013

English Version

Methods for product accelerated testing (IEC 62506:2023)

Méthodes d'essais accélérés de produits
(IEC 62506:2023)

Verfahren für beschleunigte Produktprüfungen
(IEC 62506:2023)

This European Standard was approved by CENELEC on 2023-12-12. 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.

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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

Ref. No. EN IEC 62506:2023 E

European foreword

The text of document 56/2000/FDIS, future edition 2 of IEC 62506, prepared by IEC/TC 56 "Dependability" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62506:2023.

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) 2024-09-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-12-12

This document supersedes EN 62506:2013 and all of its amendments and corrigenda (if any).

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The text of the International Standard IEC 62506:2023 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 standard indicated:

IEC 62740:2015	NOTE Approved as EN 62740:2015 (not modified)
IEC 60812	NOTE Approved as EN IEC 60812
IEC 61163-2	NOTE Approved as EN IEC 61163-2
IEC 60300-3-4	NOTE Approved as EN IEC 60300-3-4
IEC 60068 (series)	NOTE Approved as EN 60068 (series)
IEC 61014	NOTE Approved as EN 61014
IEC 61163-1	NOTE Approved as EN 61163-1
IEC 61164:2004	NOTE Approved as EN 61164:2004 (not modified)
IEC 61125:2018	NOTE Approved as EN IEC 61125:2018 (not modified)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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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.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60050-192	-	International electrotechnical vocabulary - Part 192: Dependability	-	-
IEC 60300-3-5	-	Dependability management - Part 3-5: Application guide - Reliability test conditions and statistical test principles	-	-
IEC 60605-2	-	Equipment reliability testing - Part 2: Design of test cycles	-	-
IEC 60721	series	Classification of environmental conditions	EN 60721	series
IEC 61123	2019	Reliability testing - Compliance test plans for success ratio	EN IEC 61123	2020
IEC 61124	2023	Reliability testing - Compliance tests for constant failure rate and constant failure intensity	EN IEC 61124	2023
IEC 61649	2008	Weibull analysis	EN 61649	2008
IEC 61709	-	Electric components - Reliability - Reference conditions for failure rates and stress models for conversion	EN 61709	-
IEC 61710	-	Power law model - Goodness-of-fit tests and estimation methods	EN 61710	-
IEC 62429	-	Reliability growth - Stress testing for early failures in unique complex systems	EN 62429	-

IEC 62506

Edition 2.0 2023-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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IEC 60721 (all parts), *Classification of environmental conditions*

IEC 61123:2019, *Reliability testing – Compliance test plans for success ratio*

IEC 61124:2023, *Reliability testing – Compliance tests for constant failure rate and constant failure intensity*

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