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Reliability stress screening - Part 2: Components (IEC 61163-2:2020)

Zuverlässigkeitsvorbehandlung durch Beanspruchung - Teil 2: Bauelemente (IEC 61163-2:2020)

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ICS:

03.120.01	Kakovost na splošno	Quality in general
21.020	Značilnosti in načrtovanje strojev, aparatov, opreme	Characteristics and design of machines, apparatus, equipment

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61163-2

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English Version

Reliability stress screening - Part 2: Components (IEC 61163-2:2020)

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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

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European foreword

The text of document 56/1875/FDIS, future edition 2 of IEC 61163-2, prepared by IEC/TC 56 "Dependability" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61163-2:2020.

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) 2021-01-15
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-04-15

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

IEC 61163-1	NOTE	Harmonized as EN 61163-1
IEC 62506	NOTE	Harmonized as EN 62506
IEC 61014	NOTE	Harmonized as EN 61014
IEC 62402	NOTE	Harmonized as EN IEC 62402
IEC 62506	NOTE	Harmonized as EN 62506
IEC 61709	NOTE	Harmonized as EN 61709
IEC 61649	NOTE	Harmonized as EN 61649
IEC 62740	NOTE	Harmonized as EN 62740

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RELIABILITY STRESS SCREENING –

Part 2: Components

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International Standard IEC 61163-2 has been prepared by IEC technical committee 56: Dependability.

This second edition cancels and replaces the first edition published in 1998. This edition constitutes a technical revision.

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

a) this version of the document is a complete rewrite and restructure from the previous version.

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

FDIS	Report on voting
56/1875/FDIS	56/1887/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.

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

A list of all parts in the IEC 61163 series, published under the general title *Reliability stress screening*, 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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INTRODUCTION

Although first developed to stabilize the parameters of manufactured components (burn-in), reliability stress screening (RSS) can be used to remove from a component population the weaker components. This can be done at times where the manufacturing processes for components are difficult to control or for other reasons such as where the components need to be selected (re-qualified) to operate in harsher than usual operating conditions. This is also done where more narrow specifications are required for the application and no alternative courses of action are available.

The use of RSS is normally only a temporary measure when early failures need to be avoided under a specific set of conditions as outlined above.

RSS is an effective tool in identifying and removing flaws due to poor component design and manufacturing deficiencies.

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RELIABILITY STRESS SCREENING –

Part 2: Components

1 Scope

This part of IEC 61163 provides guidance on RSS techniques and procedures for electrical, electronic, and mechanical components. This document is procedural in nature and is not, and cannot be, exhaustive with respect to component technologies due to the rapid rate of developments in the component industry.

This document is:

a) intended for component manufacturers as a guideline;

b) intended for component users as a guideline to negotiate with component manufacturers on RSS requirements;

c) intended to allow the planning of an RSS process in house to meet reliability requirements or to allow the re-qualification of components for specific, upgraded, environments;

d) intended as a guideline to sub-contractors who provide RSS as a service.

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This document is not intended to provide test plans for specific components or for delivery of certificates of conformance for batches of components.

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The use of bi-modal Weibull analysis to select and optimize an RSS process without having to estimate the reliability and life time of all items is described.

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2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
screen
conditions, for example stress level and duration, used for the removal of non-conforming items from a population

3.2
screening
process carried out to detect and remove non-conforming items, or those susceptible to early life failure

Note 1 to entry: Screening may employ representative or elevated stresses.

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[SOURCE: IEC 60050-192:2015, 192-09-11, modified – Deletion of “test” in the term, replacement of “test” with "process" in the definition and replacement of “The test” with "Screening" in the Note 1 to entry.]

3.3
RSS
reliability stress screening
process for detecting flaws by applying environmental and/or operational stresses to precipitate them as detectable failures

Note 1 to entry: RSS is designed with the intention of precipitating flaws into detectable failures. An ageing process designed specifically with the intention of stabilizing parameters is not an RSS process and is therefore outside the scope of this document.

Note 2 to entry: This note applies to the French language only.

[SOURCE: IEC 60050-192:2015, 192-09-19, modified – Addition of Note 1 to entry.]

3.4
flaw <of an item>
imperfection that could result in failure

Note 1 to entry: An imperfection in this case is a physical characteristic of the component that leads to a failure to perform in a required way.

[SOURCE: IEC 60050-192:2015, 192-04-03, modified – Addition of Note 1 to entry.]

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3.5
early life failure period
infant mortality period
time interval of early life during which the instantaneous failure intensity of a repairable item, or the instantaneous failure rate of a non-repairable item, decreases significantly with time

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Note 1 to entry: What is considered “significant” will depend upon the application.

[SOURCE: IEC 60050-192:2015, 192-02-28]

3.6
weak item
item which has a high probability of failure in the early life period due to a flaw

3.7
weak population
subset of the total population of items made up of only weak items

3.8
strong population
subset of the total population of items made up of non-weak items

4 Description of reliability stress screening (RSS)

The process of RSS is used to detect flaws in a population of items, usually components, leading to the subsequent removal of these flawed items from the population. The removal of such components facilitates rapid achievement of the reliability level expected for the population over the useful life.

This can often happen when problems with items are identified and it takes time to fix the design or the production process for the item but the existing items need to be used immediately. This is typically a sorting exercise where the RSS is used to fail the items with problems so they can be identified in the population or batches.