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Methods for product accelerated testing

(IEC 62506:2013, IDT)

产品加速试验方法

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard uses the translation method to equivalently adopt IEC 62506:2013 “Methods for product accelerated testing”.

The documents of our country that have a consistent correspondence with the international documents that are referenced in this Standard are as follows:

- GB/T 5080.1-2012, Reliability testing - Part 1: Test conditions and statistical test principles (IEC 60300-3-5:2001, IDT)

This Standard, compared with IEC 62506:2013, makes the following editorial changes:

- “a minimum 30 000 h per year” in the original text 5.2.3.1.3 is wrong; it shall be “a minimum 3 000 h per year”;
- “as the time compression may influence the stress acceleration” in the original text 5.2.3.2.1 is wrong; it shall be “as the event compression may influence the stress acceleration”;
- “Equation (3) presents a rather accurate way of expressing the overall item failure rate with applied stresses” in the original text 5.5 is wrong; it shall be “Equation (4) presents a rather accurate way of expressing the overall item failure rate with applied stresses”;
- “ n_i/N_i ”, “ t_i/L_i ” and “ α_i is the time at the i^{th} stress level” in the original text 5.6.3.2 are wrong; they shall be “ n_i/N_i ”, “ t_i/L_i ” and “ α_i is the ratio of the time at the i^{th} stress level to the life under applied loads”;
- S in equation (B.22) in the original Annex B shall be N_S ;
- “One in this group failed after 700 cycles and 10 after 1000 cycles.” and “In this second test group B, 4 failed after 300 cycles, 10 after 400 cycles, and additional 5 after 500 cycles” in Annex F of the original text are wrong; they shall be “One in this group failed after 700 cycles and 3 after 1 000 cycles.” and “In this second test group B, 5 failed after 300 cycles, 10 after 400 cycles, and additional 5 after 500 cycles.”;
- “265V” in Figure G.1 of Annex G of the original text is wrong; it shall be “25V”; the curve fitting equation, equation (G.1) and equation (G.2) in Figure G.2 are wrong and corrected.

This Standard was proposed by the Ministry of Industry and Information Technology of the People's Republic of China.

Methods for product accelerated testing

1 Scope

This standard provides guidance on the application of various accelerated test techniques for measurement or improvement of product reliability. Identification of potential failure modes that could be experienced in the use of a product/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, or to achieve necessary reliability/availability improvement, all within a compressed or accelerated period of time. This standard 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 differ from the standard probability of failure occurrence.

This standard also extends to present accelerated testing or production screening methods that would identify weakness introduced into the product by manufacturing error, which could compromise product dependability.

2 Normative references

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.

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

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

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

IEC 61649:2008, Weibull analysis

IEC 61709, Electronic 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

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-191, as well as the following apply.

3.1.1

item

The item may be an individual part, component, device, functional unit, equipment, subsystem, or system.

Note: The item may consist of hardware, software, people or any combination thereof.

3.1.2

step stress

step stress test

test in which the applied stress is increased, after each specified interval, until failure occurs or a predetermined stress level is reached

Note 1: The “intervals” could be specified in terms of number of stress applications, durations, or test sequences.

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