

ICS 03.120.01; 03.120.30
CCS L 05



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 34986-2017

Methods for product accelerated testing

产品加速试验方法

(English Translation)

Issued on: November 1, 2017

Implemented on: May 1, 2018

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine**

Table of Contents

Foreword...	4
Introduction...	6
1 Scope...	8
2 Normative references...	8
3 Terms, definitions, symbols and abbreviations...	9
3.1 Terms and definitions...	9
3.2 Symbols and abbreviated terms...	11
4 General description of the accelerated test methods...	13
4.1 Cumulative damage model...	13
4.2 Classification, methods and types of test acceleration...	15
5 Accelerated test models...	19
5.1 Type A. qualitative accelerated tests...	19
5.2 Type B and C. Quantitative accelerated test methods...	27
5.3 Failure mechanisms and test design...	32

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_1/N_1 ", " l_1/L_1 " 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 ", " l_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 NS ;

-- "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.

This Standard shall be under the jurisdiction of National Technical Committee 24 on Electric and Electronic Reliability and Maintainability of Standardization Administration of China (SAC/TC 24).

The drafting organizations of this Standard. The Fifth Institute of Electronics, Ministry of Industry and Information Technology, Wuhu Saibao Information Industry

Technology Research Institute Co., Ltd., Institute of Electronic Engineering, Chinese Academy of Engineering Physics, The 60th Research Institute of the General Staff, The 29th Research Institute of China Electronics Technology Group Corporation, Zhongxing Telecommunication Equipment Corporation, Shenzhen TCL New Technology Ltd., Hisense Group Co., Ltd., Chongqing Electric Power Research Institute, The 28th Research Institute of China Electronics Technology Group Corporation, Shanghai Institute of Process Automation & Instrumentation, AVIC 301 Institute.

The drafters of this Standard. Wang Xuekong, Hu Xianghong, Li Kai, Cheng Debin, Gao Jun, Li Jing, Xie Limei, Liu Yazhi, Zhu Liang, Jiang Nianchao, Li Yan, You Rongxian, Fan Weiqi, Liu Fenglei, Ji Jing, Zhang Ying, Li Jiajia, Wu Yueqin.

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.

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.

3 Terms, definitions, symbols and abbreviations

ratio between the item failure distribution characteristics or reliability measures (e.g., failure intensities) of an item when it is subject to stresses in expected use and those the item acquires when the higher-level stresses are applied for achieving a shorter test duration

4 General description of the accelerated test methods

Type C tests are mostly used for estimation of the life time of components where wear out in active use is the dominating failure mode; for example, switches, keyboards, relays, connectors or bearings. The data from these tests are often analyzed using the Weibull distribution, and often in the form of the so-called "sudden death test" (see IEC 60605-2).

5 Accelerated test models

The goal in accelerated testing is to measure the reliability and verify acceptable reliability performance of the product within a short period of time.

The advantage of the Type C2 test is that in a short time, by speeding up the stress repetition, the cumulative damage can be reproduced within a much shorter time than in regular use.

6 Accelerated testing strategy in product development

Assemblies are often tested for each stress type separately. But since there are more interactions possible in an assembly than in a component, combined stresses are more important for assemblies. Often assemblies have a size and a function suitable for a HALT test since HALT test often do not work well with small items (components) or large items (systems).

7 Limitations of accelerated testing methodology

There are several major limitations of accelerated reliability testing methodologies shown in the following list (which is not exhaustive).

.....