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

GB/Z 21223.3-2023

**Guidelines for the statistical analysis of ageing test data - Part
3: Minimum specimen numbers at different test conditions with
given experimental data**

老化试验数据统计分析导则 第3部分：给定试验数据的不同试验条件下的最少试样数量

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents" Drafting. This document is Part 3 of GB/T (Z) 21223 "Guidelines for Statistical Analysis of Aging Test Data". GB/T (Z) 21223 has been released. Lower part.

1. Method based on the average value of normal distribution test results;

2. Verification procedures for statistical analysis of censored normal distribution data;

3. Minimum number of specimens under different test conditions given test data. This document is equivalent to IEC /T R60493-3.2017 "Guidelines for Statistical Analysis of Aging Test Data Part

3. Given Test Data Minimum number of specimens under different test conditions. This document is converted from an IEC technical report into a national standardization guidance technical document. This document has made the following minimal editorial changes.

---Modify the writing format of the "Symbols" chapter. According to the writing rules of GB/T 1.1-2020, the "Symbols" chapter does not use a table format. format, adopting the "format specified in GB/T 1.1-2020";

---According to the writing rules of GB/T 1.1-2020, number the formulas in sequence, and list the letters and symbols in the formulas accordingly meaning and explanation. Please note that some content in this document may be subject to patents. The publisher of this

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The purpose of this document is to illustrate how statistical analysis can be performed using small sample sizes. General statistical analysis requires large sample sizes. When the dispersion of test data is small enough, statistical analysis with a small sample size can be performed. On the other hand, this document helps clarify when the number of specimens is limited (e.g. about five) and the aging conditions are fewer (e.g. two or three), e.g. How to use the dispersion of a small amount of data to estimate lifespan. Therefore, the purpose of this paper is to show whether data using a small number of samples but with a small degree of discreteness can be predicted within a certain statistical error range. Estimating life span and other performance. The methods described in this document may be useful to users, for example, manufacturers who may prefer to replace modern traditional testing methods. This new test method is easy to implement and relatively low-cost, especially suitable for small-sized samples. From this, it is proposed A statistical processing method suitable for a minimum number of specimens would be favored by manufacturers. The methods described in this document are suitable for most statistical analyses, except for some typical cases. Currently, GB/T (Z) 21223 "Guidelines for Statistical Analysis of Aging Test Data" consists of three parts.

1. Method based on the average value of normal distribution test results. The aim is to assume that aging obeys the Arrhenius law. In the case of Arrhenius's law (that is, the logarithm of failure time is a linear function of the reciprocal of thermodynamic temperature), the appropriate Statistical methods for analyzing and evaluating results from aging data.

2. Validation procedures for statistical analysis of censored normal distribution data. The

purpose is to give aging time or performance measurements Verification procedure for censored data when performance values cannot be determined due to limitations (data in this case are called "censored data").

3. Minimum number of specimens under different test conditions given test data. The purpose is to give the information on the sample (including test equipment) When the equipment is large in size, the sample cost is high, and the accelerated test is difficult to implement, the accelerated test and Methods of statistical analysis of data. Guidelines for statistical analysis of aging test data Part

1 Scope

GB/Z 21223.3-2023 addresses the practical constraint that makes ageing tests hard to design: how few specimens can be used and still support a conclusion. Ageing tests on electrical insulation run for months at several temperatures, and the statistical guidance normally assumes as many specimens as the analysis would like. Real programmes cannot supply them - the specimen may be a full-size component rather than a coupon, the test equipment holds a limited number at once, and each additional condition multiplies both the cost and the number of ovens needed. The temptation is to reduce specimens arbitrarily and report the result as though the reduction had no consequence, when in fact it widens the confidence interval to the point where the extrapolated endurance means nothing. This part describes methods of statistical analysis using a minimum number of specimens, for situations where the specimen or the test equipment is large, or the specimens are costly, or the number that can be tested is otherwise limited. As a GB/Z it is a guiding technical document. Under ICS 29.035.01 and CCS K15, it is written for insulation and materials laboratories and the engineers who design endurance test programmes.

This document describes methods for statistical analysis using a minimum number of specimens. This document is applicable to situations where the size of the specimen (including test equipment) is large, the cost of the specimen is high, and the implementation of accelerated testing is difficult to pass. Small number of samples to achieve accelerated testing and data statistical analysis.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document. IEC 60493-

3.1 Terms and definitions The terms and definitions defined in

IEC 60493-1, IEC /T R60493-2 and

IEC 62539 apply to this document. Terms and definitions used in this document from ISO and IEC are found at.

3.2 Symbols The following symbols apply to this document. A. The pre-exponential factor representing the degradation rate constant in the equation.

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