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GB/T 2423.56-2023 / IEC 60068-2-64:2019

Replacing GB/T 2423.56-2018

Environmental testing - Part 2: Test methods - Test Fh: Vibration, broadband random and guidance

环境试验 第 2 部分:试验方法 试验 Fh:宽带随机振动和导则

(IEC 60068-2-64:2019, Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance, IDT)

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**Issued by: State Administration for Market Regulation;
Standardization Administration of the People's Republic of China.**

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Foreword

This document is drafted in accordance with the rules provided in GB/T 1.1-2020 *Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents*.

This document is part 56 of GB/T 2423. See Annex NA for the published parts of GB/T 2423.

This document replaces GB/T 2423.56-2018 *Environmental testing - Part 2: Test methods - Test Fh: Vibration, broadband random and guidance*. Compared with GB/T 2423.56-2018, except for structural adjustments and editorial changes, the main technical changes are as follows:

a) Add the term “kurtosis” (see 3.39);

b) Add the term “skewness” (see 3.40);

c) Add the term “beta distribution” and “Figure 4” (see 3.41);

d) Add relevant provisions for “parameters determined during non-Gaussian vibration testing” (see Clause 5);

e) Add “For non-Gaussian vibration testing, the time history shall be recorded and the kurtosis, skewness (if applicable) and amplitude probability density shall be established as required by the relevant specification” and “Figure 5” (see 8.4.1).

This document is identical to IEC 60068-2-64:2019 *Environmental testing - Part 2-64: Test - Test Fh: Vibration, broadband random and guidance*.

This document makes the following minimal editorial changes:

a) In order to coordinate with the existing standards, change the standard name to *Environmental testing - Part 2: Test methods - Test Fh: Vibration, broadband random and guidance*;

b) Add Annex NA.

Please note that some of the contents of this document may involve patents. The issuing organization of this document is not responsible for identifying patents.

This document was proposed and managed by the National Technical Committee on Environmental Conditions of Electric and Electronic Products and Environmental Test of Standardization Administration of China (SAC/TC 8).

Drafting organizations of this document: Guangzhou University, The Fifth Institute of Electronics, Ministry of Industry and Information Technology, Beijing University of

Environmental testing – Part 2: Test methods – Test Fh: Vibration, broadband random and guidance

1 Scope

This document demonstrates the adequacy of specimens to resist dynamic loads without unacceptable degradation of its functional and/or structural integrity when subjected to the specified random vibration test requirements.

Broadband random vibration may be used to identify accumulated stress effects and the resulting mechanical weakness and degradation in the specified performance. This information, in conjunction with the relevant specification, may be used to assess the acceptability of specimens.

This document is applicable to specimens which may be subjected to vibration of a stochastic nature resulting from transportation or operational environments, for example in aircraft, space vehicles and land vehicles. It is primarily intended for unpackaged specimens, and for items in their transportation container when the latter may be considered as part of the specimen itself. However, if the item is packaged, then the item itself is referred to as a product and the item and its packaging together are referred to as a test specimen. This standard may be used in conjunction with GB/T 2423.43-2008, for testing packaged products.

If the specimens are subjected to vibration of a combination of random and deterministic nature resulting from transportation or real-life environments, for example in aircraft, space vehicles and for items in their transportation container, testing with pure random may not be sufficient. See GB/T 2424.26-2008 for estimating the dynamic vibration environment of the specimen and based on that, selecting the appropriate test method.

Although primarily intended for electrotechnical specimens, this standard is not restricted to them and may be used in other fields where desired (see Annex A).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2041, Vibration and shock – Vocabulary specimen. It is therefore recommended that prior to mounting a specimen in its fixture a dynamic response survey or modal test be performed on the fixture and necessary modifications performed to avoid putting unrealistic loads into the specimen.

B.2 Requirements for testing

B.2.1 Single-point and multipoint control

The test requirements are confirmed by the acceleration spectral density computed from the random signal measured at the reference point.

For stiff or small-size specimens, for example in component testing, or if it is known that the dynamic influence of the specimen is low and the test fixture is stiff in the test frequency range there need only be one checkpoint, which then becomes the reference point.

In the case of large or complex specimens, for example equipment with well-spaced fixing points, either one of the checkpoints, or some other point is specified for reference. For a fictitious point, the acceleration spectral density is computed from the random signals measured at the checkpoints. It is recommended that for large and/or complex specimens a fictitious point is used.

B.2.1.1 Single-point control

Measurements are made at one reference point and the indicated acceleration spectral density is directly compared with the specified acceleration spectral density.

B.2.1.2 Multipoint control

When multipoint control is specified or necessary, two frequency domain control strategies are available.

B.2.1.2.1 Averaging strategy

In this method the acceleration spectral density is computed from the signal of each checkpoint. A composite acceleration spectral density is found by arithmetically averaging the acceleration spectral density of these checkpoints.

The arithmetically averaged acceleration spectral density is then compared to the specified acceleration spectral density.

B.2.1.2.2 Extremal strategy

In this method, a composite acceleration spectral density is computed from the maximum or the minimum extreme value of each frequency line of the acceleration spectral density measured at each checkpoint. This method is also called ‘maximum’ or ‘minimum’ strategy, because it produces an acceleration spectral density which represents the envelope of the acceleration spectral densities of each checkpoint.

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