



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

**GB/T 2423.10-2019**

---

**Environmental testing - Part 2: Test methods - Test Fc: Vibration  
(sinusoidal)**

**Issued on: June 4, 2019**

**Implemented on: January 1, 2020**

---

**Issued by: SAMR; SAC**

## Table of Contents

|                                                             |    |
|-------------------------------------------------------------|----|
| Foreword...                                                 | 4  |
| Introduction...                                             | 6  |
| 1 Scope...                                                  | 7  |
| 2 Normative References...                                   | 7  |
| 3 Terms and Definitions...                                  | 8  |
| 4 Requirements for Testing...                               | 11 |
| 4.1 Required characteristics...                             | 11 |
| 4.2 Control strategy...                                     | 14 |
| 4.3 Mounting...                                             | 16 |
| 5 Severities...                                             | 16 |
| 5.1 Frequency range...                                      | 17 |
| 5.2 Vibration amplitude...                                  | 17 |
| 5.3 Duration of endurance...                                | 19 |
| 6 Preconditioning...                                        | 20 |
| 7 Initial Measurements...                                   | 20 |
| 8 Testing...                                                | 20 |
| 8.1 General...                                              | 20 |
| 8.2 Vibration response investigation...                     | 21 |
| 8.3 Endurance procedures...                                 | 22 |
| 9 Intermediate Measurements...                              | 23 |
| 10 Recovery...                                              | 23 |
| 11 Final Measurements...                                    | 23 |
| 12 Information to be Given in the Relevant Specification... | 23 |
| 13 Information to be Given in the Test Report...            | 24 |
| Appendix A (Informative) Guide to Test FC...                | 26 |

### Foreword

GB/T 2423 Environmental Testing - Part 2. Test Methods can be divided into several parts according to the test method.

This Part belongs to Part 10 of GB/T 2423.

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard replaced GB/T 2423.10-2008 Environmental Testing for Electric and Electronic Products - Part 2.Tests Methods - Test Fc. Vibration (Sinusoidal).

Compared with GB/T 2423.10-2008, this Part has the major technical changes as follows.

- Add the test contents on the package sample;
- Make more detailed provisions on the selection of severity level parameters (see Clause 5 of this Edition; Clause 5 of 2008 Edition);
- Add the specification and description for the control strategy (see 4.2 of this Edition);
- Add the requirements for test report (see Clause 13 of this Edition).

This Part used the translation method to equivalently adopt IEC 60068-2-6.2007 Environmental Testing - Part 2-6.Tests - Test Fc. Vibration (Sinusoidal).

The Chinese documents that have a consistent correspondence with the international documents quoted in the Normative References of this Part are as follows.

- GB/T 2298-2010 Mechanical Vibration, Shock and Condition Monitoring - Vocabulary (ISO 2041.2009, IDT);
- GB/T 2421.1-2008 Environmental Testing for Electric and Electronic Products - General and Guidance (IEC 60068-1.1988, IDT);
- GB/T 2423.43-2008 Environmental Testing for Electric and Electronic Products - Part 2.Test Methods - Mounting of Specimens for Vibration Impact and Similar Dynamic Tests (IEC 60068-2-47.2005, IDT)
- GB/T 4798 (all parts) Environmental Conditions Existing in the Application of Electric and Electronic Products [IEC 60721-3 (all parts)]; the consistence all parts between the two standards can see Annex NA.

For the benefit of use, this Part made the following editorial change.

- Modify the standard name.

This Part was proposed by and under the jurisdiction of National Technical Committee

on Environmental Conditions of Electric and Electronic Products and Environment at Test of Standardization Administration of China (SAC/TC 8).

Drafting organizations of this Part. The Fifth Research Institute of MIIT; Shanghai Institute of Quality Inspection and Technical Research Institute; Beihang University; and Shanghai Institute of Process Automation Instrumentation.

Chief drafting staffs of this Part. Chang Shaoli, Lu Zhaoming, Li Chuanri, Ji Chunyang, Jiang Can, Xu Zhonggen, and Shi Xiaowen.

The historical editions replaced by this Standard are as follows.

--- GB/T 2423.10-1981, GB/T 2423.10-1995, GB/T 2423.10-2008;

--- GB/T 2423.7-1981.

## 1 Scope

This Part of GB/T 2423 gives a method of test which provides a standard procedure to determine the ability of components, equipment and other articles (hereinafter referred to as specimens) to withstand specified severities of sinusoidal vibration. If an item is to be tested in an unpackaged form, that is without its packaging, it is referred to as a test specimen.

## 2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 27025-2008 General Requirements for the Competence of Testing and Calibration Laboratories (ISO/IEC 17025:2005, IDT)

IEC 60068-1 Environmental Testing - Part 1.General and Guidance

## 3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

Point, chosen from the check points, whose signal is used to control the test, so that

the requirements of this standard are satisfied.

Sweeping over a restricted frequency range between 0.8 and 1.2 times the critical frequency.

## 4 Requirements for Testing

The maximum vibration amplitude at the check points in any axis perpendicular to the specified axis shall not exceed 50 % of the specified amplitude up to 500 Hz or 100 % for frequencies in excess of 500 Hz.

If stated in the relevant specification, the acceleration amplitude of the control signal at the fundamental driving frequency shall be restored to the specified value by use of a tracking filter (see A.4.4).

The control amplitude  $a_C$  is formed by averaging the signal amplitude from the check points  $a_1$  to  $a_n$  according to their weighting  $w_1$  to  $w_n$ .

## 5 Severities

Each value of displacement amplitude is associated with a corresponding value of acceleration amplitude (shown in the same horizontal grid in the Figures 1 and 2) so that the amplitude of vibration is the same at the cross-over frequency (see A.4.1).

The duration stated in the relevant specification shall take into account the total time the specimen is expected to be submitted to such vibration during its operational life.

An upper limit of  $10^7$  stress cycles shall apply for each stated combination of frequency and axis (see Clause A.1 and A.6.2).

## 6 Preconditioning

The relevant specification may call for preconditioning and shall then prescribe the conditions (see IEC 60068-1).

## 7 Initial Measurements

The specimen shall be submitted to the visual, dimensional and functional checks prescribed by the relevant specification (see Clause A.9).