

ICS 49.020

CCS V 70



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

**GB/T 34516-2017**

---

**Vibration test methods for spacecraft**

航天器振动试验方法

**Issued on: November 1, 2017**

**Implemented on: May 1, 2018**

---

**Issued by: General Administration of Quality Supervision, Inspection and  
Quarantine;  
Standardization Administration of the PRC**

## Table of Contents

- 1 Scope
- 2 Terms and definitions

### Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard proposed by China Aerospace Science and Technology Corporation. This standard by the National Aerospace Technology and Standardization Technical Committee (SAC/TC425) centralized. This standard was drafted by: Beijing Satellite Environmental Engineering Institute, Beijing Space Vehicle Design Department, China Academy of Space Technology Letter Satellite Division, China Academy of Space Technology, the Ministry of Manned Space, Aerospace Dongfanghong Satellite Co., Ltd., Shanghai Institute of Satellite Equipment. The main drafters of this standard. Xu Lanju, Fan Shichao, Zhu Jiantao, Yue Zhiyong, Li Zhengju, Feng Guosong, Wang Haiming, Chu Liyan, Zhang Li. Spacecraft vibration test method

### 1 Scope

China's national standard for vibration testing spacecraft. It specifies the test system requirements, the test procedures, the interruption and handling of a test, and the evaluation of results, and it applies to system level spacecraft vibration testing and to subsystem and component level tests. Launch is the most violent few minutes of a spacecraft's life and the only part that can be rehearsed. The vehicle shakes it through a broadband random spectrum from the engines and the aerodynamics, and through low frequency transients at ignition, staging and separation, and everything that will ever go wrong mechanically is most likely to go wrong then. So the spacecraft is bolted to a shaker and driven through a spectrum enveloping what the launcher will do. The provisions on interrupting a test are the ones that matter most in practice: a test article that shows an unexpected response must be stopped before the test destroys the only flight unit, and knowing when to stop is a judgement that has to be made in seconds.

This standard specifies the spacecraft vibration test requirements of the test system, test procedures, test interruption and treatment, test results evaluation. This standard applies to the spacecraft system level (hereinafter referred to as spacecraft) vibration test, sub-system-level and component-level vibration test can refer to the implementation.

### 2 Terms and definitions

The following terms and definitions apply to this document.

2.1 Test conditions allow deviation testconditiontolerance Test range of the actual loading conditions and test conditions allowed between the deviation.

2.2 Test over-test During the test spacecraft to withstand the test value is higher than the upper limit of the allowable deviation of the test value phenomenon.

2.3 Under-test under-test In the course of the test, the test value of the spacecraft is lower than the lower limit of the allowable deviation of the specified test value.

2.4 Multi-point average control multi-pointaveragecontrol The response to multiple control points is averaged, and the average is compared with the experimental level set point, with the difference between the two tests Way to control.

2.5 Multi-point control multi-pointextremevaluecontrol Envelope the response values of multiple control points and compare the envelope value with the experimental magnitude setting, using the difference between the two to test Way to control. Extreme control usually includes maximum control and minimum control, which correspond to the maximum envelope and minimum Envelope.

2.6 Sweeprate Sinusoidal sweep Vibration test frequency sweep rate. Usually divided into two kinds of linear and logarithmic scanning, linear scanning frequency by line Changes in the law of nature, that is, within a unit of time the frequency range of change for the set value, in units of hertz per minute (Hz/min); logarithmic frequency by Changes in the number of rules, that is, the frequency of the unit of time within the frequency range of the octave as a fixed value, in octaves per minute (Oct/min).

2.7 Not concave During the vibration test, the vibration response of certain spacecraft on the spacecraft is controlled not to exceed the specified value and the vibration input level Technology.

2.8 Response control responsecontrol Vibration test to ensure that the key parts of the spacecraft response does not exceed the limit value, the control system to measure the response of the site and in accordance with