

ICS 49.060
CCS V 71



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

GB/T 32307-2024

Replacing GB/T 32307-2015

**Assessment and control methods of spacecraft magnetic
property**

航天器磁性评估和控制方法

Issued on: May 28, 2024

Implemented on: December 1, 2024

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and Definitions	1
4 Spacecraft Magnetic Index Requirements	2
5 Spacecraft Magnetic Assessment and Control Objectives	3
6 Spacecraft Magnetic Assessment and Control Process	3
7 Spacecraft Magnetic Design Evaluation	4
8 Spacecraft Magnetic Control	6
9 Spacecraft Magnetic Test	10
52 Appendix M (Informative) On-orbit magnetic moment fluctuation data of a spacecraft under the multi-payload rotating component working mode	53

Foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting: This document replaces GB/T 32307-2015 Spacecraft Magnetic Assessment and Control: Compared with GB/T 32307-2015, except for the structural adjustment In addition to editorial changes, the main technical changes are as follows:

- a) Added the terms "magnetic field", "magnetic moment" and "magnetic purification" (see 3:1, 3:2 and 3:14);
- b) Changed "Magnetic Assessment and Control Process" and "Spacecraft Magnetic Control" (see Chapter 6, 8:2:2:2, Chapter 6,:2015 Edition) 9:2:2:2);
- c) Added requirements for spacecraft magnetic test and evaluation (see Chapter 10);
- d) Deleted the factors affecting spacecraft magnetic measurement (see 10:3 of the:2015 edition);
- e) Added the appendix "Magnetic data of typical spacecraft motors before and after magnetic shielding" and "Tests of several special magnetic sensors in near-field analysis method" Layout method", "Magnetic moment calibration method of ferromagnetic tooling equipment in magnetic testing", "Magnetic moment magnitude and scale classification of spacecraft", "A spacecraft On-orbit magnetic moment change fluctuation data in multi-load rotating component working mode" (see Appendix H, Appendix J, Appendix K, Appendix L, Appendix M): Please note that some of the contents of this document may involve patents:

The issuing organization of this document does not assume the responsibility for identifying patents: This document was proposed and coordinated by the National Technical Committee for Standardization of Aerospace Technology and Its Applications (SAC/TC425): This document was drafted by: Shanghai Satellite Equipment Research Institute, Beijing Satellite Environment Engineering Research Institute, Shanghai Satellite Engineering Research Institute, China Aerospace Institute of Standardization: The main drafters of this document are: Wu Weiquan, Fang Baodong, Peng Guangdong, Xiao Qi, Tao Jingliang, Wang Hao, Sun Xiaochun, Zong Juan, Zhou Yu, Xu Dongyan, Zhang Chi, Xiao Wenbin, Wang Tao, Zhou Xueqin, Qiao Chunxin: This document was first published in: 2015 and this is the first revision: Spacecraft Magnetic Assessment and Control Methods

1 Scope

GB/T 32307-2024 specifies the purpose, procedure and methods for assessing and controlling the magnetic properties of a spacecraft. A satellite carries a residual magnetic moment made up of remanent, stray, induced and eddy current contributions, and that moment does two damaging things: it interacts with the Earth's field to produce a disturbance torque the attitude control system has to spend propellant or momentum fighting, and it contaminates any magnetometer the spacecraft carries, which for a scientific mission can destroy the measurement it was launched to make. The standard sets the magnetic property indices required of a spacecraft, the purpose and procedure of assessment and control, the assessment of the magnetic design, the magnetic control measures themselves, the magnetic testing and, new to this edition, the assessment of the test results. Thirteen informative annexes carry the working material: the orbital magnetic environments, the unit systems and conversion factors, the principal magnetic sources, the classification and calculation of magnetic moments, the moment per unit mass, eddy current and hysteresis effects on spinning spacecraft, measured data for typical components before and after magnetisation and for motors before and after shielding, the test methods over eight pages, the sensor layouts for near-field analysis, the calibration of ferromagnetic tooling, and in-orbit moment variation data. It replaces GB/T 32307-2015, which is superseded.

This document specifies the objectives, procedures and methods for spacecraft magnetic evaluation and magnetic control: This document is applicable to the magnetic evaluation and magnetic control of spacecraft, and can be used as a reference for the magnetic evaluation and control of spacecraft parts and components:

2 Normative references

This document has no normative references:

3 Terms and definitions

The following terms and definitions apply to this document: 3:

1 Magnetic field A special form of matter generated by the space around magnets, electric currents, and moving electric charges, which transmits the magnetic field between real objects:

Note: The field strength that usually constitutes the magnetic moment of spacecraft products includes residual magnetic field, stray magnetic field, induced magnetic field and eddy current magnetic field: 3:

2 Magnetic moment A physical property of magnetic objects, which is a physical quantity that describes the magnetism of magnets and current-carrying coils:

Note: The magnetic moment corresponding to the field intensity source includes the residual magnetic moment, stray magnetic moment, induced magnetic moment and eddy current magnetic moment: 3:

3 The magnetic field that remains when the spacecraft is not operating after the external magnetic field is eliminated: 3:

4 The magnetic moment corresponding to the spacecraft's residual magnetic field: 3:

5 When the spacecraft is powered on, the magnetic field is caused by the electric current: 3:

6 The magnetic moment corresponding to the stray magnetic field of the spacecraft: 3:

7 The magnetic field induced by the soft magnetic materials of the spacecraft under the influence of internal and external magnetic field factors: 3:

8 The magnetic moment corresponding to the magnetic field sensed by the spacecraft: