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GB/T 31967.4-2025

Test method for physical property of rare earth permanent magnetic materials - Part 4: Determination of compressive strength

稀土永磁材料物理性能测试方法 第4部分：抗压强度的测试

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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 4 of GB/T 31967, "Test Methods for Physical Properties of Rare Earth Permanent Magnet Materials". GB/T 31967 has been published. The following section.

1.Determination of Magnetic Flux Temperature Characteristics;

2.Determination of flexural strength and fracture toughness;

3.Resistivity Testing;

4.Test of compressive strength. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed and is under the jurisdiction of the National Rare Earth Standardization Technical Committee (SAC/TC229). This document was drafted by: Fujian Jinlong Rare Earth Co., Ltd., Beijing Zhongke Sanhuan High-Tech Co., Ltd., and Fujian Changting. Zall Technology Co., Ltd., Anhui Dadi Xiong New Materials Co., Ltd., Baotou Kerui Micro Magnetic New Materials Co., Ltd., Ningbo Yunsheng Co., Ltd., Ganzhou Fuert Electronics Co., Ltd., Hangzhou Quadrant Technology Co., Ltd., and National Standard (Beijing) Inspection and Certification Co., Ltd. The company, China Jiliang University, Baotou Inste Rare Earth New Materials Co., Ltd., Hangzhou Meici Technology Co., Ltd., Baotou Rare Earth Research Institute Institute, Jiangxi Provincial Tungsten and Rare Earth Products Quality Supervision and Inspection Center (Jiangxi Provincial Tungsten and Rare Earth Research Institute), GRINM Rare Earth (Rongcheng) Co., Ltd., Qiandong Rare Earth Group Co., Ltd., Jiangxi Zhongshi New Materials Co., Ltd., Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, and GRINM Rare Earth New Materials Co., Ltd., and Nonferrous Metals Technology and Economic Research Institute Co., Ltd. The main drafters of this document are. Zhang Jiulei, Wang Jinfeng, Chen Dakun, Xu Deqin, Cao Shuohao, Li Dongxiang, Bao Cheng, Lin Jirong, Li Lingling, and Qi Zhiqi. Wei Jihao, Liu Xueying, Tao Shan, Dong Gaihua, Zhan

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Rare earth permanent magnet materials are among the most important rare earth functional materials, and are widely used in new energy vehicles and wind power generation due to their excellent magnetic properties. Applications include electricity, household appliances, weaponry, and aerospace. GB/T 31967 aims to establish a complete, practical, and [unclear - possibly related to testing and research] system. Standardized methods for testing the physical properties of rare earth permanent magnet materials to meet the application and trade demands. These methods are tailored to specific usage requirements, application scope, and different sub-categories. Due to reasons such as the technical independence between analytical methods, GB/T 31967 consists of four parts.

1.Determination of Flux Temperature Characteristics. The aim is to establish a method for determining the flux temperature characteristics of rare-earth permanent magnet materials in an open circuit. method.

2.Determination of Bending Strength and Fracture Toughness. The aim is to establish a method for determining the bending strength and fracture toughness of rare earth permanent magnet materials using a three-point bending method. Methods for measuring flexural strength and fracture toughness.

3.Resistivity Testing. The aim is to establish the Kelvin method, van der Berg method, and four-probe method for testing the resistivity of rare-earth permanent magnet materials. Resistivity method.

4.Compressive Strength Testing. The aim is to establish a method for testing the compressive strength of rare-earth permanent magnet materials using compression. This document selects factors related to compressive strength measurement (selection of test pressure plate, sample surface roughness, sample size, test rate, verticality). Tests were conducted to assess straightness, parallelism, flatness, and test temperature, in order to more accurately measure the compressive strength of rare earth permanent magnet materials and provide guidance for users in selecting appropriate materials. Using rare-earth permanent magnet materials to provide more accurate performance indicators will enable a proper assessment of their application in different working conditions, thereby driving industrial development. Healthy development. Physical property testing methods for rare earth permanent magnet materials Part

1 Scope

GB/T 31967.4-2025 is the Chinese national standard covering the compressive strength of

a sintered magnet - the specimen and its preparation on a material that chips easily, the loading rate, and the strength value, which is what a designer needs when a magnet is clamped or press-fitted into a rotor. Part 4 of the series, first edition. In force from 1 May 2026. It was issued on 31 October 2025 and has been in force since 1 May 2026, as a first edition. The document is under the responsibility of the Standardization Administration of China. This page is published from the official record of the 2025 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes a test method for the compressive strength of rare earth permanent magnet materials. This document applies to the testing of compressive strength of rare earth permanent magnet materials.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 6379.2 Accuracy (correctness and precision) of measurement methods and results - Part

2.Determining the repeatability of standard measurement methods Basic methods of sex and representation

GB/T 7314 Metallic materials - Compression test at room temperature

GB/T 8170 Rules for rounding off numerical values and the representation and determination of limiting values

GB/T 10623 Terminology for Testing Mechanical Properties of Metallic Materials

GB/T 16825.1-2022 Inspection and Calibration of Static Uniaxial Testing Machines for Metallic Materials - Part

1.Tensile and/or Compressive Testing Inspection and calibration of the machine force measurement system

3 Terms and Definitions

The terms and definitions defined in GB/T 7314 and GB/T 10623, as well as the following terms and definitions, apply to this document.

3.1 compression force The force exerted on a material in the direction of contraction during compression.

3.2 Compressive strength The maximum compressive force that a material can withstand per unit area before it is compressed and destroyed.

3.3 Crushing For sintered rare earth permanent magnet materials, such as sintered NdFeB and sintered SmCo, when subjected to compressive force, the force exceeds the material's strength. The material's strength limit is reached, causing it to break into small pieces or powder.

3.4 fracturing For bonded rare-earth permanent magnet materials, such as bonded NdFeB and bonded SMAFeN, when subjected to compressive force, the force exceeds... The strength limit of a material leads to the formation of cracks or fissures.