

ICS 29.030

CCS K 14



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

GB/T 43266-2023

**Methods for measuring the angular deviation of magnetization
of permanent magnets**

永磁体磁偏角的测量方法

Issued on: November 27, 2023

Implemented on: June 1, 2024

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

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Foreword

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Peiling, Huang Jianglun, Guo Yan: Measurement method of magnetic declination angle of permanent magnets

1 Scope

China's national methods for measuring the angular deviation of magnetization in permanent magnets. A sintered magnet is anisotropic: its powder is aligned in a field before pressing, so the material has an easy axis, and the magnet is magnetised along it. The angular deviation is the difference between the direction the magnet is actually magnetised in and the direction the design intended, and it arises from imperfect alignment during pressing or from the magnetising fixture. Its effect is straightforward and costly. In a motor, a magnet whose field is tilted by even a couple of degrees contributes a component of flux that does no useful work and does produce cogging and losses, and in an assembly of many magnets the deviations do not cancel. Measuring it requires resolving the field direction rather than its magnitude, which is why it needs its own method alongside the surface field mapping.

This document describes methods for measuring the magnetic declination of permanent magnets: This document is suitable for the measurement of magnetic declination angle of permanent magnets such as rare earth iron boron, rare earth cobalt, alnico, and permanent ferrite:

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text: Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document: GB/T 2900:

60 Electrical Terminology Electromagnetics GB/T 2900:

83 Electrical terminology Electrical and magnetic devices

GB/T 9637 Electrical Terminology Magnetic Materials and Components

GB/T 38437 Method for measuring the magnetic dipole moment of ferromagnetic material samples by pulling or rotating JJF1059:

3 Terms and definitions

The following terms and definitions as defined in GB/T 2900:60, GB/T 2900:83 and GB/T 9637 apply to this document: 3:

1 After the permanent magnet is magnetized, the direction of the actual magnetic dipole moment j (actual magnetization direction) is the same as the direction of the designed ideal

magnetic dipole moment j_z (ideal magnetization direction): direction) (see Figure 1):

Note: The magnetic declination angle of permanent magnets is generally generated during material preparation or processing of finished products: Figure

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