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**Measuring methods for the surface magnetic field distribution
of permanent magnets**

永磁体表面磁场分布测试方法

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Foreword

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1 Scope

China's national methods for measuring the surface magnetic field distribution of permanent magnets. A magnet's bulk properties - remanence, coercivity, energy product - describe the material, and the surface field distribution describes the component. They are not the same thing, and it is the second that determines whether the magnet works in its application. A motor magnet with the right remanence but a field that varies along its length produces torque ripple; one whose magnetisation direction is not uniform produces a field pattern that the motor design did not assume; and a magnet with a demagnetised region from a manufacturing fault looks identical to a sound one on every bulk measurement. Mapping the field over the surface with a Hall probe or an array reveals all of it, which is why this is a production inspection rather than a laboratory characterisation.

This document describes the method of measuring the magnetic field distribution on the surface of permanent magnets using magnetic field detectors and magnetometers, including the selection of test points, measurement Apparatus, specimens, test procedures and data processing: This document is applicable to the surface magnetic field analysis of permanent magnets such as rare earth iron boron, rare earth cobalt, alnico, and permanent ferrite magnetized by various magnetization methods: Cloth detection:

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 1800:

1 Product Geometric Specification (GPS) Linear Dimensional Tolerance ISO Code System Part 1: Tolerances, Deviations and The basis for cooperation

GB/T 2900:60-2002 Electrical Terminology Electromagnetics JJF1059:

3 Terms and definitions

The terms and definitions defined in GB/T 2900:60-2002 and the following apply to this document: 3:

1 The surface of the permanent magnet where the poles are located:

Note: Anisotropic permanent magnets generally have surfaces that are perpendicular to or intersect with the orientation direction; isotropic permanent magnets generally have surfaces that are perpendicular to or intersect with the magnetization direction: 3:

2 Test distance The vertical distance between the center of the effective sensing area of the magnetic field detector and the test surface:

4 Test principle

Use magnetic field detectors (probes), magnetometers and recording equipment to measure and record the magnetic field intensity in the specified direction on the surface of the permanent magnet to obtain The magnetic field strength at each test point on the surface of the permanent magnet:

5 Test point selection

Determine the measurement trajectory according to the geometry and magnetization direction of the permanent magnet, and select test points on the measurement trajectory: The pole surface of the permanent magnet is flat The test trajectories when Position, select several points on the entire 360° circle according to the principle of uniform diameter distribution: The schematic diagram of the test points is shown in Figure 6 to Figure 8: