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

GB/T 41605-2022

**Silicon nitride materials for rolling bearing balls - Test method
for fracture resistance at room temperature - Indentation
fracture (IF) method**

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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 of Standardization Documents" drafted.

This document is modified using ISO 14627.2012 "Fine ceramics (advanced ceramics, high-tech ceramics) Determination by indentation fracture method at room temperature Test Methods for Fracture Resistance of Silicon Nitride Materials for Rolling Bearing Balls. Compared with ISO 14627.2012, this document has more structural adjustments. Comparison list of structure number changes between two files

See Appendix A.

Compared with ISO 14627.2012, this document has many technical differences. In the outer margins of the clauses involved, use vertical

A single line (?) is marked. See Appendix B for a list of these technical differences and their reasons.

The following editorial changes have been made to this document.

---In order to harmonize with the existing standards, the standard name is changed to "Test Method for Indentation Fracture Resistance of Silicon Nitride Materials for Rolling Bearing Balls at Room Temperature"

Indentation method";

--- Adjust the "scope" of the ISO 14627.2012 document, and integrate the content related to KI and IFR in the "scope" with Definition 3.1

And redefine the term "3.1".

Please note that some content of this document may be patented. The issuing agency of

this document assumes no responsibility for identifying patents.

1 Scope

test method.

This document applies to silicon nitride materials for bearing balls.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, dated citations

documents, only the version corresponding to that date applies to this document; for undated references, the latest edition (including all amendments) applies to

this document.

JC/T 2172 Fine ceramic elastic modulus, shear modulus and Poisson's ratio test methods pulse excitation method

ISO 6507-2 Vickers hardness test for metallic materials - Part 2. Inspection and calibration of hardness testers (Metalicmaterials-

Note. GB/T 4340.2-2012 Vickers hardness test for metallic materials Part 2. Inspection and calibration of hardness testers (ISO 6507-2:2005, MOD)

ISO 26602:2017 Fine ceramics (advanced ceramics, advanced technical ceramics) silicon nitride materials for rolling bearing balls and rollers [Finece-

balsandrolers]

Note. GB/T 31703-2015 Ceramic Ball Bearing Silicon Nitride Balls (ISO 26602:2009, NEQ)

3 Terms and Definitions

ISO 26602:2017 and the following terms and definitions apply to this document.

3.1

KI, IFR

The ability of a material to resist indentation to produce crack propagation.

Note. KI and IFR are related to the wear resistance of the material, the rolling contact fatigue life of the bearing ball and the processing technology of the silicon nitride material.

KI, IFR are different from fracture toughness

KIC, KIC is the intrinsic property of the material and has nothing to do with the test method.

[Source. ISO 26602:2017, 3.1, with modifications]

3.2

preprocessedbal

Unprocessed silicon nitride balls after sintering.

4 Principles

The detection method of KI and IFR is to press the diamond indenter of the Vickers hardness tester into the sample to be tested. After the indenter is removed, measure the two diagonal lines of the indentation.