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

GB/T 45771-2025

**Fine ceramics - Methods for evaluating wear and friction
characteristics of ceramic thin films under dry and humid
conditions**

(English Translation)

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Table of Contents

Preface	
Introduction	
1 Scope	
2 Normative references	
3 Terms and Definitions	
4 Sample	
5 Test Principle	
6 Laboratory Environment	
7 Wear tester	
7.1 Reciprocating wear testing machine	
7.2 Ball-on-disc wear tester	
7.3 Constant temperature and humidity chamber	
7.4 Dew point meter	
7.5 Probe Profilometer	
7.6 Laser Interferometer Profilometer	
7.7 Optical Microscope	
7.8 Scanning Electron Microscope	
7.9 Energy Dispersive X-ray Spectrometer	
7.10 Drying chamber	
7.11 Vacuum Pump	
8 Sample Preparation	
9 Sample pretreatment	
9.1 General	
9.2 Sample cleaning	
9.3 Sample drying	
10 Environmental conditions for wear test	
10.1 Overview	
10.2 Dry environment	
10.3 High humidity environment	
11 Wear test conditions	
11.1 Reciprocating wear test conditions	
11.2 Rotational wear test conditions	

- 12 Cross-sectional area of wear scar of specimen
- 13 Measurement of the volume of the worn part of the spherical indenter
 - 13.1 General
 - 13.2 Observation of the profile of the worn part of the spherical indenter
 - 13.3 Calculation of the volume of the worn portion of a spherical indenter
- 14 Analysis of the morphology and element distribution of the wear scar and the worn part of the spherical indenter on the film sample
 - 14.1 General
 - 14.2 Morphology Observation
 - 14.3 Analysis of element distribution diagrams
- 15 Calculation of friction coefficient
- 16 Test Procedure
 - 16.1 Thickness of film specimen
 - 16.2 Preparation and Cleaning of Thin Film Specimens
 - 16.3 Wear conditions
 - 16.4 Wear test
 - 16.5 Evaluation of friction and wear characteristics of film sample surface after wear test
- 17 Notes on Test Results
- 18 Test Report
- Appendix A (Informative) Comparison of structure numbers between this document and ISO 23737:2021
- Appendix B (Informative) Technical differences between this document and ISO 23737:2021 and their causes
- Appendix C (Informative) Examples of results of reciprocating wear test and rotational wear test
 - C.1 Differences between reciprocating wear results and rotating wear results
 - C.2 Examples of reciprocating wear results and rotating wear results
- Appendix D (Informative) Method for clamping polymer films or thin glass plates with a thickness of less than 200 µm in abrasion tests

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 is modified to adopt ISO 23737:2021 "Fine ceramics (advanced ceramics, advanced technical ceramics) - Evaluation of performance under dry and wet conditions"

Method for the wear and friction characteristics of fine ceramic films.

Compared with ISO 23737:2021, this document has many structural adjustments.

See Appendix A.

This document has many technical differences compared to ISO 23737:2021.

A list of these technical differences and their causes is given in Appendix B.

The following editorial changes have been made to this document.

--- To coordinate with the existing standards, the name of the standard is changed to "Evaluation Method of Friction and Wear Characteristics of Ceramic Films under Dry and Wet Environments for Fine Ceramics" Law";

--- Deleted the references to "EN1071-12, ISO 20808 and EN1071-13" in Chapter 5, "EN1071-12" in 7.1, and "EN1071-13" in 13.3 "EN1071-13" in 16.1, "EN1071-10" in 16.1;

--- Added Appendix A (informative) "Comparison of this document with ISO 23737:2021 structure numbers";

--- Added Appendix B (informative) "Technical differences between this document and ISO 23737:2021 and their causes".

Introduction

Fine ceramic films are widely used in sensors, brakes, micro-mechanical components, display components, memory components, recording media, etc.

In the industrial application of fine ceramic films, wear resistance Ambient humidity and the film's previous exposure to moisture have a significant impact on the wear resistance of fine ceramic films.

Fine ceramic films are also often used in environments with different humidity, and standards need to be established to evaluate their wear resistance and friction under a wide range of humidity.

The currently published standards for abrasion resistance testing are limited to an ambient temperature of 23°C and a relative humidity (RH) of 50%, and these test standards are not suitable for evaluating films with a thickness of approximately 10 µm for use in electronic and optical devices.

The wear resistance of fine ceramic films with a thickness of 1 µm and below is affected by the relative humidity of the test environment because of the small indentation load.

The influence of relative humidity (RH) on the wear test mechanism of fine ceramic films with small indentation loads is affected by the relative humidity (RH) of the test environment.

Therefore, the wear test of fine ceramic films should be carried out under controlled relative humidity (RH) conditions.

The aim is to promote industrial development by rapidly promoting the application of these test methods.

Fine ceramics in dry and wet environments Evaluation methods for friction and wear characteristics

1 Scope

This document describes the method for evaluating the wear resistance and coefficient of friction of fine ceramic films in wet and dry environments.

This document is applicable to the evaluation of the friction and wear characteristics of thin films with a thickness of about 1 μm or less and deposited on a substrate or substrate, including thin substrates.

Or thin films on very thin organic polymer film substrates.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 6062 Product Geometry Specification (GPS) Nominal characteristics of surface structure profilometry contact (stylus) instruments (GB/T 6062-2009, ISO 3274:1996, IDT)
GB/T 17991 Terminology for Fine Ceramics (GB/T 17991-2009, ISO 20507:2003, MOD)
GB/T 18778.1 Product Geometric Specification (GPS) Surface Structure Profile Method Surfaces with Composite Machining Features Part 1: Filtering and general measurement conditions (GB/T 18778.1-2002, ISO 13565-1:1996, IDT) GB/T 18778.2 Product Geometric Specification (GPS) Surface Structure Profile Method Surfaces with Composite Machining Features Part 2: Characterization of height characteristics using linearized support ratio curves (GB/T 18778.2-2003, ISO 13565-2:1996, IDT)

3 Terms and Definitions

The terms and definitions defined in GB/T 17991 and the following apply to this document.

wear

The phenomenon of continuous loss or dislocation of the surface of solid materials due to the relative motion of contacting objects.