

ICS 83.080.01

CCS G 31



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

GB/T 41878-2022

Plastics - Determination of scratch properties

Issued on: October 12, 2022

Implemented on: October 12, 2022

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

foreword

Introduction

1 Scope

2 Normative references

3 Terms and Definitions

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"

Drafting.

This document is modified to adopt ISO 19252.2008 "Determination of scratch properties of plastics".

Compared with ISO 19252.2008, this document has more structural adjustments.

Comparison list of structure number changes between two files

See Appendix A.

The technical differences between this document and ISO 19252.2008 and their reasons are as follows.

--- Added normative reference to ISO 472.2013 (see Chapter 3) to facilitate understanding of the contents of this document.

--- Replaced ISO 3167.2002 with the normatively cited GB/T 37426 (see 6.1), there is no consistent correspondence between the two documents

relationship, in order to adapt to the development trend of domestic sample preparation.

--- Changed "A-type multi-purpose sample" to "A1-type multi-purpose sample or F-type sample", and increased the size requirements of F-type sample

(see 6.1), in order to adapt to the current development trend of domestic sample preparation.

--- Replaced ISO 294-1 (see 6.2) with the normatively quoted GB/T 17037.1 to adapt to the technical conditions of our country and increase the operability

Action.

--- Added normative reference GB/T 17037.5 (see 6.2) to make this document applicable to a wider range of practical applications.

--- Changed the description of single cavity mold and GB /ISO mold (see 6.2) to adapt to the development of my country's industry.

--- Replaced ISO 291 (see 6.5) with the normatively cited GB/T 2918 to adapt to my country's technical conditions and increase operability.

--- Changed the maximum test load of the linear growth load, so that this document can be applied to a wider range of practical applications, and the specific adjustments are as follows.

* Changed "Test load should increase linearly from 1N to 50N" to "Test load" in "Linear growth load (optional method)"

The load should increase linearly from 1N to 50N (maximum test load 50N) or 1N linearly increase to 100N (maximum test load

load 100N)" (see 7.2.3.3);

* In "Linear growth load (optional method)", add "before the test, carry out a pre-test of 1N~50N. If there is a material

If the material is peeled off, use the test load to measure the critical normal load of the sample; if there is no material peeling, use 1N~100N

Determine the critical normal load of the specimen" (see 7.2.3.3);

* Changed the maximum test load range in Table 1;

* Changed the maximum test load in formula (1).

---Modified "Weak, occasional signal vibration caused by the equipment itself can be ignored during the test (tangential scratch force amplitude

less than 3N, the displacement amplitude of the scraper is less than 10μm)", changed from the additional information to the required clause (see 8.1), which is convenient for the standard

understand.

The following editorial changes have been made to this document.

--- Deleted the duplicate content with "Principle" in the "Scope" chapter;

--- Added the term "scratch phase diagram" (see 3.9) to facilitate understanding of the contents of this document;

--- Adjust Figure 1 to Chapter 4;

- Added the description of the index number "3" and the index symbol "R" (see Figure 1);
- Added Appendix A (informative) "Structure Number Comparison List";
- Changed Appendix B (informative) "Schematic Diagram of Scratch Damage Mode";
- Changed Appendix C (informative) "Schematic Diagram of Scratch Measurement Equipment".

Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

Test methods for plastic scratch performance are basically developed in the automotive industry. The commonly used plastic scratch performance testing methods in the industry are.

Five-finger scratch test, cross scratch test, hardness test pen scratch, etc. Although the above methods are widely used, their evaluation results are mostly qualitative.

The parameters can only be loaded with constant load, the load cannot be continuously changed, and the load and rate that lead to scratch damage cannot be quantitatively obtained.

In-depth analysis of scratch performance.

This document establishes a new scratch performance test method that compares scratch visibility, scratch failure mode with test load, tangential scratch force,

The parameters such as scratch distance and critical normal load are established, and scratches can be further evaluated with the help of other auxiliary equipment. The method includes

"Constant load" and "Linear increasing load" two test load modes.

With the promotion of scratch technology in many fields, "linear growth load" has been paid more and more attention by academia and industry. In addition, with

With the continuous progress of plastic modification processing technology and the continuous emergence of new functional plastics, this document increases the maximum test load of linear growth load

load, so that this document can be applied to a wider range of practical applications.

Determination of scratch properties of plastics

1 Scope

This document specifies the test methods for the scratch performance of plastics under

given conditions, including the formation of scratches and the evaluation of the results and test specimens.

Optimum size and optimal geometry of the shaving head.

This document is suitable for characterizing the scratching behavior of a specific type of specimen under given scratching conditions.

This document applies to uncoated and unpainted thermoplastic molding materials and thermoset molding materials.

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.

GB/T 2918 Standard Environment for Conditioning and Testing of Plastic Specimens (GB/T 2918-2018, ISO 291.2008, MOD)

GB/T 17037.1 Preparation of injection-molded specimens for plastic thermoplastic materials - Part 1.General principles and multi-purpose specimens and lengths

Preparation of strip samples (GB/T 17037.1-2009, ISO 294-1.2017, MOD)

GB/T 17037.5 Preparation of injection-molded specimens for plastic thermoplastic materials - Part 5.Standard specimens for evaluation of anisotropy

Preparation (GB/T 17037.5-2020, ISO 294-5.2017, MOD)

GB/T 37426 Plastic samples (GB/T 37426-2019, ISO 20753.2018, MOD)

ISO 472.2013 Plastics terms and their definitions (Plastics-Vocabulary)

ISO 10724-1 Preparation of injection-molded test specimens for plastic thermosetting powder molding compounds (PMCs) - Part 1.General principles and details

3 Terms and Definitions

ISO 472.2013 and the following terms and definitions apply to this document.

3.1

scratches

Given the shape of the scraper, the test load, and the test speed, the scraper will cause damage to the sample surface when the scraper moves on the sample surface.