

ICS 83.080.01

CCS G 31



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

GB/T 44303-2024

**Plastics - Quantitative evaluation of scratch-induced damage
and scratch visibility**

塑料 划痕损伤和划痕可见性的定量评估

(English Translation)

Issued on: August 23, 2024

Implemented on: August 23, 2024

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

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Reference

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 17541:2014 "Quantitative assessment of scratch damage and scratch visibility in plastics".

Compared with ISO 17541:2014, this document has many structural adjustments. Comparison table of structural number changes between the two documents See Appendix A.

The technical differences between this document and ISO 17541:2014 and their reasons are as follows.

- ISO 6508-1 (see 5.2) has been replaced by the normative reference GB/T 230.1 to adapt to my country's technical conditions and increase operability Sex;
- ISO 19252 (see 5.2) has been replaced by the normative reference GB/T 41878 to adapt to my country's technical conditions and increase operability Sex;
- "Test load" (see 5.4) is replaced by "normal force" to facilitate the understanding of the content of this document;
- ISO 20753 (see 6.2) has been replaced by the normative reference GB/T 37426 to adapt to my country's technical conditions and increase operability Sex;
- ISO 294-1 (see 6.3) has been replaced by the normative reference GB/T 17037.1 to adapt to my country's technical conditions and increase operability Sexuality;
- ISO 294-2 (see 6.3) has been replaced by the normative reference GB/T 17037.2 to adapt to my country's technical conditions and increase operability Sexuality;
- ISO 294-3 (see 6.3) has been replaced by the normative reference GB/T 17037.3 to adapt to my country's technical conditions and increase operability Sexuality;
- Added normative reference GB/T 17037.5 (see 6.3) to make this document applicable to a wider range of practical applications;
- Added normative references to ISO 10724-1 (see 6.3) to make this document applicable to a wider range of practical applications;

--- ISO 291 (see 6.4) has been replaced by the normative reference GB/T 2918 to adapt to my country's technical conditions and increase operability.

--- Added "scratch length (when a scratch length other than 100 mm is selected)" and "test date" (see Chapter 10) to adapt to the technical requirements of my country.

Technical conditions and increase operability.

The following editorial changes were made to this document.

--- Added "Introduction";

--- Deleted the content repeated in "Scope" and "Principle";

--- Added "Note" (see 3.1, 3.2, 3.5, 3.8, 8.3.1);

--- Deleted the "Description" in Figure 3;

--- Deleted the definitions of "scratch damage index" and "scratch visibility index" in "Principle" (see Chapter 4);

--- Split the original formula (5) into formula (5) and formula (6) (see 8.2.3);

--- Split the original formula (8) into formula (9) and formula (10) (see 8.3.2);

--- Added Appendix A (informative) "Structure number comparison list".

Introduction

The test method for plastic scratch performance was developed by the automotive industry. The commonly used plastic scratch performance test methods in the industry, such as five-finger scratch Scratch test, cross scratch test, hardness test pen scratch test, etc. can only load a constant load, and it is difficult to quickly determine the test load that causes scratch damage.

GB/T 41878-2022 applies a constant load or a linear increase in the scratch performance of the material.

The spherical scratch head was used to scratch the surface of the specimen, and the scratch visibility, scratch damage form, test load, tangential scratch force, and scratch Corresponding relationships are established between parameters such as distance and critical normal load.

This paper establishes a method for quantitatively evaluating scratch damage and scratch visibility. First, a constant load or linear growth the load is applied, and scratches are formed on the surface of the sample using a surface contact scraper or a line contact scraper; then, the scratches are scanned to generate a digital scratch image;

Finally, the scratch damage and scratch visibility were quantitatively evaluated using image analysis software.

Scratch usually includes mar. In recent years, with the continuous deepening of the research on scratch characterization technology, Researchers have found that scratches and abrasions differ in formation mechanism and damage mode. The differences between scratches and abrasions will be further studied in future research.

This document does not yet distinguish between these differences.

Quantitative assessment of scratch damage and scratch visibility in plastics

1 Scope

This document describes two methods for quantitatively evaluating scratch damage and scratch visibility in plastics using coordinate values of a three-dimensional color model, including Method A (constant load) and method B (linearly increasing load).

This document specifies the dimensions of the test specimen and the geometry of the scraper head.

This document applies to surface coated and uncoated thermoplastic molding materials and thermosetting molding materials.

2 Normative references

The contents of the following documents constitute 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 230.1 Rockwell hardness test for metallic materials Part 1: Test method (GB/T 230.1-2018, ISO 6508-1.

2016,MOD)

GB/T 2918 Standard environment for conditioning and testing of plastic specimens (GB/T 2918-2018, ISO 291:2008, MOD) GB/T 17037.1 Plastics - Preparation of injection moulded test specimens for thermoplastic materials - Part 1: General principles and multi-purpose test specimens and long Preparation of strip specimens (GB/T 17037.1-2019, ISO 294-1:2017, MOD) GB/T 17037.2 Plastics - Preparation of injection moulded test specimens for thermoplastic materials - Part 2: Small tensile test specimens (GB/T 17037.2-2020,ISO 294-2:2018,MOD) GB/T 17037.3 Plastics - Preparation of injection moulding specimens for thermoplastic materials - Part 3: Small square test pieces (GB/T 17037.3-2003,ISO 294-3:2002,IDT) GB/T 17037.5 Plastics - Preparation of injection moulded test specimens for thermoplastic materials - Part 5: Preparation of standard test specimens for anisotropy assessment preparation GB/T 37426 Plastic test specimens