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

GB/T 44559.1-2024

**Plastics - Determination of puncture impact behaviour of rigid
plastics - Part 1: Non-instrumented impact testing**

塑料 硬质塑料冲孔性能的测定 第1部分：非仪器化冲击试验

(English Translation)

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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 for standardization documents" Drafting.

This document is part 1 of GB/T 44559 "Plastics - Determination of the punching properties of rigid plastics". GB/T 44559 has been published the following parts.

--- Part 1: Non-instrumented impact test.

This document is modified from ISO 6603-1:2000 "Plastics - Determination of the punching properties of rigid plastics - Part 1: Non-instrumented impact test".

This document has made the following structural adjustments compared to ISO 6603-1:2000.

--- 7.6.5 and 7.7.5 correspond to 7.8 of ISO 6603-1:2000;

--- Increased the degree of consistency between GB/T 27797 (all parts) and ISO 1268 (all parts) (see Appendix A);

--- Change Appendix A of ISO 6603-1:2000 to Appendix B;

---Added references.

The technical differences between this document and ISO 6603-1:2000 and their reasons are as follows.

--- The normative reference GB/T 2918 replaced ISO 291:1997, GB/T 5471 replaced ISO 295:1991, GB/T 9352 replaces ISO 293:1986, GB/T 17037.3 replaces ISO 294-3:1996, GB/T 27797 (all Part) replaced ISO 1268 (all parts) and GB/T 39812 replaced ISO 2818:1994 to adapt to my country's technical requirements.

Technical conditions and increase operability;

--- Added the accuracy requirements of D3, D4, H and R dimensions (see Table 1) for use

in equipment manufacturing;

--- Added "a distance much greater than the length of the hammer head should be left below the support" (see 5.1.5) to draw the attention of equipment manufacturers;

--- The 6.2" specimens in ISO 6603-1:2000 can also be prepared by cutting or punching equipment, because the test has no effect on the cut edges of the specimens.

"Special requirements" is changed to Note (see 6.2) because this content is intended to draw the reader's attention;

--- Deleted the description of using a thickness gauge to check the specimen in 6.4 of ISO 6603-1:2000, because there is no relevant judgment basis for this method;

--- Change the note in 7.2 of ISO 6603-1:2000 to the main text (see 7.2), because the note is a requirement and will affect the test result;

--- Added the provision that "the specimen clamped is indicated by "C" and the specimen not clamped is indicated by "U"" (see 7.3) to match the content of the test report.

The content (see Chapter 9) corresponds to

--- Change the note in 7.6.4.2 of ISO 6603-1:2000 to the main text (see 7.6.4.2), because the note is a requirement.

Affect the test results.

The following editorial changes were made to this document.

--- The selection conditions and test methods of non-instrumented impact test methods and instrumented impact test methods in the scope of ISO 6603-1:2000 the conditions for comparability of results, the method is not suitable for direct prediction of the impact properties of finished products and the description of instrumented impact testing were changed to this the contents of the introduction to the document (see Introduction);

--- ISO 6603-2, which is an informative reference in ISO 6603-1:2000, is included in the references (see Chapter 1);

--- Deleted ISO 7765-1 and ISO 7765-2 which were not referenced in the main text of ISO 6603-1:2000 and listed them in the references ISO 7765 (alparts) (see Chapter 1);

--- Added notes on the terms 50% impact failure energy, 50% impact failure mass and 50% impact failure height (see 3.3.1~ 3.3.3);

--- Change the description of the two test methods in the scope of ISO 6603-1:2000 (see Chapter 1 of ISO 6603-1:2000) to this the content of the principle part of the document (see Chapter 4);

--- Change the description of the index symbols in Figure 5 of ISO 6603-1:2000 to the contents of Table 1 (see 5.1.1);

- Change the references to ISO 6603-2:2000 in ISO 6603-1:2000 to ISO 6603-2:2023 (see 5.1.4, 5.1.8 Note and 7.4);
- Change the dimension table of hammer head and support combination in ISO 6603-1:2000 (see 5.1.6 of ISO 6603-1:2000) to this document Contents of the test sample (see Table 2 in 6.1);
- Added notes on linear fitting (see 7.7.4.1);
- Deleted the examples of test parameter representation in ISO 6603-1:2000 test report and the units and the provisions for significant figures (see Chapter 9 of ISO 6603-1:2000).

Introduction

Drop hammer impact is a test in which a hammer strikes the surface of a specimen in a free-falling manner and vertically perforates the center of the specimen.

The falling height is different, so the speed at which it reaches the surface of the sample is different. This difference in speed and the difference in the mass of the hammer result in different impact energy on the sample.

The energy that causes the perforation of the sample is different, which is used to evaluate the impact resistance of the sample.

GB/T 44559 specifies the test method for determining the punching performance of rigid plastics, which is intended to consist of the following two parts.

--- Part 1: Non-instrumented impact test. The impact failure of the specimen is determined by counting or fitting the number of specimen impact failures.

The results are comparable only when the specifications, dimensions, surface preparation conditions and test conditions of the specimens remain consistent.

The test results of specimens with different thicknesses are not comparable. The comprehensive evaluation of impact stress is based on the different properties (such as crystallinity and water content).

The impact velocity and temperature of the material (particulate content) are determined by the impact test results of the non-instrumented impact test.

Impact properties, but can be tested on specimens machined from the finished product.

--- Part 2: Instrumented impact test. A constant impact velocity is used to record the force-displacement or force-time curve.

Samples with different temperatures, impact velocities, thicknesses and preparation methods are used to obtain the typical characteristic properties of the material.

Plastics - Determination of the punching properties of rigid plastics Part 1:

Non-instrumented impact tests

1 Scope

This document describes a method for determining the punching properties of flat rigid plastics (e.g. square or circular sheets).

This document specifies different types of test specimens and their test conditions.

This document applies to drop weight impact tests perpendicular to the plane of plastics and molded materials.

This document determines the impact performance of plastics based on the impact failure energy threshold of many specimens. The test data obtained should not be used for design calculation.

This document is applicable to specimens with a thickness of 1mm~4mm.

Note: For specimens with a thickness less than 1 mm, ISO 7765 (all parts) should be used for testing; for specimens with a thickness greater than 4 mm, they are not covered in this document and Within the scope specified in ISO 6603-2.

This document applies to the following materials.

--- Rigid thermoplastic moulding and extrusion materials, including filled, unfilled and reinforced materials and sheets;

--- Rigid thermosetting moulding and extrusion materials, including filled and reinforced materials, sheets and laminates;

--- Fiber unidirectional or multidirectional reinforced thermosetting and thermoplastic composite materials, such as felt, fabric, textile roving, chopped strands, composite reinforcement Materials, rovings and milled fibers, sheets made of pre-impregnated materials (prepreg blanks).

This document applies to molded test specimens as well as test specimens machined from products such as molded sheet, laminated sheet, extruded or cast sheet.

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 2918 Standard environment for conditioning and testing of plastic specimens (GB/T 2918-2018, ISO 291:2008, MOD) GB/T 5471 Plastics Compression moulding of