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

GB/T 1632.1-2024

Replacing GB/T 1632.1-2008

**Plastics - Determination of the viscosity of polymers in dilute
solution using capillary viscometers - Part 1: General principles**

塑料 使用毛细管黏度计测定聚合物稀溶液黏度 第1部分：通则

(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 1632 "Plastics - Determination of viscosity of dilute polymer solutions using capillary viscometers".

The following parts have been published.

- Part 1: General;
- Part 3: Polyethylene and polypropylene;
- Part 4: Polycarbonate (PC) molding and extrusion materials;
- Part 5: Thermoplastic homo- and co-polyesters (TP).

This document replaces GB/T 1632.1-2008 "Plastics - Determination of viscosity of dilute polymer solutions using capillary viscometers - Part 1: General Compared with GB/T 1632.1-2008, in addition to structural adjustments and editorial changes, the main technical

changes are as follows.

- Deleted some of the applicable scope in the scope to increase operability (see Chapter 1, Chapter 1 of the 2008 edition);
- Deleted some terms and definitions (see 3.1 of the 2008 edition);
- Added the viscometer constant of the recommended viscometer (see Table 1 in Chapter 5);
- Changed the requirements for the constant temperature bath required for the test (see 5.3, 5.3 of the 2008 edition);
- Changed the requirements for the graduation value of the temperature measuring device within the use range (see 5.4, 5.4 of the 2008 edition);
- Added factors that require standardization of solution preparation [see 6.1g)];
- Changed the selection requirements for test temperature (see Chapter 7, Chapter 7 of the 2008 edition);
- Added general rules for testing solvents and solutions (see 8.1);
- Changed the Appendix "Sources of Error" to an informative appendix (see Appendix A, Appendix B of the 2008 edition);
- Deleted the content of instrument calibration in the appendix "Instrument Cleaning" (see Appendix B, Appendix A of the 2008 edition).

This document is modified to adopt ISO 1628-1:2021 "Plastics - Determination of viscosity of dilute polymer solutions using capillary viscometers - Part 1.

General Rules.

The technical differences between this document and ISO 1628-1:2021 and their reasons are as follows.

- Deleted part of the scope of application to increase operability (see Chapter 1, Chapter 1 of the 2008 edition);
- Added the logarithmic viscosity symbol " η_{ln} " (see 3.2.4) to adapt to my country's technical conditions;
- The normative reference GB/T 30514 replaces ISO 3105 (see Chapter 5) to adapt to my country's technical conditions;
- Changed the dimension of the temperature difference requirement for the constant temperature bath (see 5.3) to increase operability.

Introduction

Different polymer dilute solution viscosity tests have different detailed requirements. Specific methods are more suitable for specific types, states and forms than general rules.

This document provides an overview of these methods. The various methods described in this document have corresponding standards and are used in actual measurement.

On test.

GB/T 1632 "Plastics - Determination of viscosity of dilute polymer solutions using capillary viscometer" is intended to consist of five parts.

--- Part 1: General. The purpose is to specify the general method for determining the concentrated viscosity, intrinsic viscosity and K-value of dilute solutions of organic polymers.

Conditions and standard parameters for viscosity determination.

--- Part 2: Polyvinyl chloride resin. The purpose is to specify the concentrated viscosity (also known as viscosity number) and K value of polyvinyl chloride (PVC) resin. Determine the conditions and establish procedures that are operational, traceable and verifiable.

--- Part 3: Polyethylene and polypropylene. The purpose is to specify the concentrated viscosity (also known as the method for determining the viscosity number and intrinsic viscosity should be established in an operable, traceable and verifiable procedure.

--- Part 4: Polycarbonate (PC) molding and extrusion materials. The purpose is to specify the viscosity (also known as specific the determination methods of concentrated viscosity and relative viscosity should be established in a feasible, traceable and verifiable procedure.

--- Part 5: Thermoplastic homopolymer and copolymer polyesters (TP). The purpose is to specify the thermoplastic polyesters in certain specific solvents.

(TP) Method for determining the viscosity of dilute solutions (also expressed as "concentrated viscosity") by establishing an operational, traceable and verifiable procedure.

--- Part 6: Methyl methacrylate polymers. The purpose is to specify the determination of methyl methacrylate polymer molding and extrusion materials the conditions for determining the viscosity of the dilute solution of the material should be established in an operational, traceable and verifiable procedure.

Plastics Polymers using capillary viscometer Viscosity of dilute solutions Part 1: General

1 Scope

This document specifies the general conditions for determining the concentrated viscosity, intrinsic viscosity and K value of dilute organic polymer solutions and the standard for viscosity determination.

parameter.

This document can be used as the basis for the determination of the viscosity of various polymer solutions. It is also applicable to the viscosity of polymer solutions for which no specific standards are available.

Determination of.

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 30514 Glass capillary kinematic viscometer Specifications and operating instructions (GB/T 30514-2014, ISO 3105:1994, MOD) ISO 80000-1 Quantities and units - Part 1: General ISO 80000-4 Quantities and units - Part 4: Mechanics

3 Terms and definitions

For the purpose of this document, the terms and definitions defined in ISO 80000-1 and ISO 80000-4 and the following apply.

3.1 Terms and definitions applicable to any liquid

3.1.1

Viscosity

The fluid is shearing between two planes, one of which moves within the plane and moves linearly at a uniform speed relative to the other plane.

The viscosity of this fluid is defined according to Newton's equation, see formula (1).

$\tau = \eta \gamma$

Where.

τ ---shear stress, unit is Pascal (Pa);