

ICS 83.080.01

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

**GB/T 19466.7-2025**

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**Plastics - Differential scanning calorimetry (DSC) method - Part  
7: Determination of crystallization kinetics**

塑料 差示扫描量热 (DSC) 法 第7部分: 结晶动力学的测定

**(English Translation)**

**Issued on: December 2, 2025**

**Implemented on: July 1, 2026**

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**Issued by: State Administration for Market Regulation**

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### Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 7 of GB/T 19466, "Differential Scanning Calorimetry (DSC) for Plastics". GB/T 19466 has published the following...

part.

---Part 1: General Rules;

---Part 2: Determination of glass transition temperature and step height;

---Part 3: Determination of melting and crystallization temperatures and enthalpy;

---Part 4: Determination of specific heat capacity;

---Part 5: Determination of temperature, time, enthalpy of reaction, and conversion rate for characteristic reaction curves;

---Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT);

---Part 7: Determination of Crystallization Kinetics;

---Part 8: Determination of thermal conductivity.

This document is modified to adopt ISO 11357-7:2022 "Differential scanning calorimetry (DSC) for plastics - Part 7: Determination of crystallization kinetics".

This document has undergone the following structural adjustments compared to ISO 11357-7:2022.

---10.1 corresponds to 9.1 of ISO 11357-7:2022.

The technical differences between this document and ISO 11357-7:2022, and the reasons therefor, are as follows.

---ISO 427 (see Chapter 3) has been replaced with the normatively referenced GB/T 2035 to adapt to my country's technical conditions and increase operability.

Actual nature;

---ISO 11357-1 has been replaced by the normatively referenced GB/T 19466.1 (see Chapters 3-7, 8.1, 9.2, and 12).

To adapt to my country's technological conditions and increase operability;

---ISO 11357-3 (see Chapter 3, 10.2.2) has been replaced with the normatively referenced GB/T 19466.3 to adapt to my country's technical requirements.

Add components to increase operability;

---Added instrument preparation (see 9.1), consistent with other parts of GB/T 19466.

The following editorial changes have been made to this document.

---Added "Note. Select the material to check the symmetry of the temperature scale according to the specific program of the instrument. Liquid crystal material is recommended in cooling mode." for materials, select metals such as In and Zn under the heating mode. For more information and content, please refer to references [1] and [2]. "(See 5.5);

--- "Place the sample in the crucible" should be changed to "Load the sample" (see 9.2);

--- "Place the crucible into the instrument" should be changed to "Load the crucible" (see 9.3);

---Change "crystallinity" to "relative crystallinity" (see 10.1.1, 10.1.2, A.1.1).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Plastics Standardization (SAC/TC15).

## Introduction

GB/T 19466 "Differential Scanning Calorimetry (DSC) Method for Plastics" is a standard that uses differential scanning calorimetry (DSC) to measure the properties of thermoplastic and thermosetting materials.

Standard methods for thermal analysis of polymers, including molding materials and composites, in the field of plastics. These methods include the use of differential scanning

calorimetry.

The general rules and methods for various thermodynamic and kinetic determinations of polymers are proposed to consist of eight parts.

---Part 1: General Rules. The purpose is to establish a method for determining the composition of plastics, including molding materials and composites, using differential scanning calorimetry (DSC).

The general principles and relevant rules governing the thermodynamics and kinetics of polymers such as materials.

---Part 2: Determination of Glass Transition Temperature and Step Height. The purpose is to provide a basis for the determination of glass transition temperature and step height.

Establish comparable methods.

---Part 3: Determination of Melting and Crystallization Temperatures and Enthalpy. The purpose is to determine the melting and crystallization temperatures of crystalline and semi-crystalline polymers.

Establish comparable methods for the determination of enthalpy.

---Part 4: Determination of specific heat capacity. The aim is to establish a comparable method for determining the specific heat capacity of plastics.

---Part 5: Characteristic Reaction Curves - Determination of Temperature, Time, Enthalpy, and Conversion Rate. The purpose is to provide a basis for determining the reaction rate of solid or liquid monomers.

Establish comparable methods for determining the temperature and time, enthalpy of reaction, and conversion rate of the prepolymer and polymer reaction.

---Part 6: Determination of Oxidation Induction Time (Isothermal OIT) and Oxidation Induction Temperature (Dynamic OIT). The aim is to provide a basis for determining the oxidation induction time (OIT) and oxidation induction temperature (Dynamic OIT) of polymers.

Establish comparable methods for determining the oxidation induction time and oxidation induction temperature of materials.

---Part 7: Determination of Crystallization Kinetics. The aim is to establish comparable methods for determining polymer crystallization kinetics.

---Part 8: Determination of Thermal Conductivity. The aim is to establish comparable methods for determining the thermal conductivity of plastics.

Differential Scanning Calorimetry (DSC) for Plastics Part 7: Determination of Crystallization Kinetics

## 1 Scope

This document describes two methods for determining polymer crystallization kinetics using differential scanning calorimetry (DSC). isothermal and non-isothermal methods.

warm method).

This document applies to the determination of crystallization kinetics of crystalline and semi-crystalline polymers.

**Note:** This method is not applicable if the molecular structure of the polymer changes during the test.

## 2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 2035 Plastics Terminology (GB/T 2035-2024, ISO 472:2013, NEQ) GB/T 19466.1 Differential Scanning Calorimetry (DSC) for Plastics - Part 1: General Rules (GB/T 19466.1-2025) ISO 11357-1:2023, MOD) GB/T 19466.3 Differential Scanning Calorimetry (DSC) for Plastics - Part 3: Determination of Melting and Crystallization Temperatures and Enthalpy (GB/T 19466.3-2025, ISO 11357-3:2018, MOD)

## 3 Terms and Definitions

The terms and definitions defined in GB/T 2035, GB/T 19466.1 and GB/T 19466.3, as well as the following terms and definitions, apply to this document.

Research on the effects of variables such as time, temperature, pressure, stress, and molecular structure on the crystallization rate of materials.

**Note:** In addition to the factors mentioned above, additives, fillers, or contaminants may also alter the crystallinity of the polymer at the end of crystallization.

Relative crystallinity the ratio of the degree of crystallinity at a specific time or temperature to the degree of crystallinity at the end of crystallization.

**Note 1:** Relative crystallinity can be expressed as a ratio or percentage.

**Note 2:** In DSC, relative crystallinity can be expressed as the ratio of the area enclosed by the crystallization peak and the baseline at a certain time or temperature to the total area of the crystallization peak.