BSI Standards Publication

Plastics — Differential scanning calorimetry (DSC)

Part 1: General principles

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National foreword

This British Standard is the UK implementation of EN ISO 11357-1:2023. It is identical to ISO 11357-1:2023. It supersedes BS EN ISO 11357-1:2016, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/21, Testing of plastics.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Published by BSI Standards Limited 2023

ISBN 978 0 539 21282 2

ICS 83.080.01

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2023.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD **EN ISO 11357-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2023

ICS 83.080.01

Supersedes EN ISO 11357-1:2016

English Version

Plastics - Differential scanning calorimetry (DSC) - Part 1: General principles (ISO 11357-1:2023)

Plastiques - Analyse calorimétrique différentielle (DSC) - Partie 1: Principes généraux (ISO 11357-1:2023)

Kunststoffe - Dynamische Differenzkalorimetrie (DSC) - Teil 1: Allgemeine Grundlagen (ISO 11357-1:2023)

This European Standard was approved by CEN on 25 February 2023.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN ISO 11357-1:2023 E

European foreword

This document (EN ISO 11357-1:2023) has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 “Plastics” the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2023, and conflicting national standards shall be withdrawn at the latest by September 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 11357-1:2016.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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Endorsement notice

The text of ISO 11357-1:2023 has been approved by CEN as EN ISO 11357-1:2023 without any modification.

Contents

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties.*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 249, *Plastics,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 11357-1:2016), which has been technically revised.

The main changes compared to the previous edition are as follows:

— the examples of materials given for temperature and enthalpy calibration have been updated;

— the data of sapphire to be used for calibration of heat flow rate have been updated.

A list of all parts in the ISO 11357 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The ISO 11357 series describes thermoanalytical DSC test methods which can be used for quality assurance purposes, for routine checks of raw materials and finished products, or for the determination of comparable data needed for data sheets or databases. The procedures given in ISO 11357 apply as long as product standards or standards describing special atmospheres for conditioning of specimens do not specify otherwise.

Plastics — Differential scanning calorimetry (DSC) —

Part 1: General principles

SAFETY STATEMENT — Persons using this document should be familiar with normal laboratory practice, if applicable. This document does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to determine applicable regulatory requirements.

1 Scope

The ISO 11357 series specifies several differential scanning calorimetry (DSC) methods for the thermal analysis of polymers and polymer blends, such as

— thermoplastics (polymers, moulding compounds and other moulding materials, with or without fillers, fibres or reinforcements),

— thermosets (uncured or cured materials, with or without fillers, fibres or reinforcements), and

— elastomers (with or without fillers, fibres or reinforcements).

The ISO 11357 series is applicable for the observation and measurement of various properties of, and phenomena associated with, the above-mentioned materials, such as

— physical transitions (glass transition, phase transitions such as melting and crystallization, polymorphic transitions, etc.),

— chemical reactions (polymerization, crosslinking and curing of elastomers and thermosets, etc.),

— the stability to oxidation, and

— the heat capacity.

This document specifies a number of general aspects of differential scanning calorimetry, such as the principle and the apparatus, sampling, calibration and general aspects of the procedure and test report common to all parts.

Details on performing specific methods are given in subsequent parts of the ISO 11357 series (see Foreword).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 472, *Plastics — Vocabulary*

ISO 80000-5, *Quantities and units — Part 5: Thermodynamics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472, ISO 80000-5 and the following apply.