International Standard

ISO 11359-3

Plastics — Thermomechanical analysis (TMA) —

Part 3: Determination of penetration temperature

Plastiques — Analyse thermomécanique (TMA) —

Partie 3: Détermination de la température de pénétration

Third edition
2026-04

Reference number
ISO 11359-3:2026(en)

© ISO 2026



COPYRIGHT PROTECTED DOCUMENT

© ISO 2026

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Principle **1**
5 Apparatus **2**
5.1 TMA apparatus 2
5.2 Penetration probe 2
6 Test specimen **2**
6.1 Preparation 2
6.2 Conditioning 2
7 Procedure **2**
7.1 Calibration of apparatus 2
7.2 Measurement 2
8 Expression of results **3**
9 Precision **3**
10 Test report **3**
Bibliography **5**

© ISO 2026 – All rights reserved

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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*.

This third edition cancels and replaces the second edition (ISO 11359-3:2019), which has been technically revised.

The main changes are as follows:

— the reference to this document, any deviations and any unusual features observed have been added to the test report.

A list of all parts in the ISO 11359 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.

© ISO 2026 – All rights reserved

Plastics — Thermomechanical analysis (TMA) —

Part 3:
Determination of penetration temperature

1 Scope

This document specifies a method for the determination of the penetration temperature of thermoplastics using thermomechanical analysis (TMA).

NOTE This method can also be used to measure the softening point.

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 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 472, *Plastics — Vocabulary*

ISO 11359-1, *Plastics — Thermomechanical analysis (TMA) — Part 1: General principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472, ISO 11359-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
penetration mode
thermomechanical analysis mode used to measure the displacement of a penetration probe caused by the softening of a test specimen

3.2
penetration temperature
temperature at which an abrupt probe displacement takes place during *penetration mode* (3.1)

4 Principle

The temperature at which the probe of a TMA apparatus begins to penetrate or change its rate of penetration is determined under a defined load when the temperature is raised at a constant rate.

© ISO 2026 – All rights reserved