

This is a preview of "ISO 6721-11:2019". [Click here to purchase the full version from the ANSI store.](#)

Second edition
2019-06

Plastics — Determination of dynamic mechanical properties —

Part 11: Glass transition temperature

*Plastiques — Détermination des propriétés mécaniques
dynamiques —*

Partie 11: Température de transition vitreuse



Reference number
ISO 6721-11:2019(E)

© ISO 2019



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

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
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of "ISO 6721-11:2019". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	2
5 Apparatus	3
5.1 Test equipment.....	3
5.2 Devices for measuring test specimen dimensions.....	3
6 Test specimen	3
6.1 General.....	3
6.2 Shape and dimensions.....	3
6.3 Preparation.....	4
7 Number of specimens	4
8 Conditioning	4
9 Test procedure	4
9.1 Test atmosphere.....	4
9.2 Operation.....	5
9.2.1 Method A — Rate-dependent results — Full procedure.....	5
9.2.2 Offset method — Rate dependent results.....	6
9.2.3 Method B — Rate-independent results.....	7
10 Expression of results	7
11 Precision	7
12 Test report	7
Annex A (normative) Calibration procedures	9
Annex B (informative) Assessment of heating rate sensitivity using reference sample	10
Bibliography	14

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*.

This second edition cancels and replaces the first edition (ISO 6721-11:2012), which has been technically revised. The main changes compared to the previous edition are as follows:

- the scope has been revised to specify suitable materials more accurately;
- definitions of specific points in DMA curves have been extended;
- reference to quality assurance purposes have been deleted;
- several methods have been introduced for evaluation of the glass transition temperature;
- the procedure for determination of heat dependent results has been revised;
- curves of storage modulus, loss modulus and loss factor have been added to the test report;
- the temperature calibration procedure has been revised;
- additional temperature reference specimen for different loading modes has been introduced.

A list of all parts in the ISO 6721 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 <https://www.iso.org/members.html>.

This is a preview of "ISO 6721-11:2019". [Click here to purchase the full version from the ANSI store.](#)

Introduction

This document covers the use of dynamic mechanical analysis (DMA) procedures, in the temperature scanning mode, to determine a value for the glass transition temperature of plastics. It provides an alternative procedure to the use of differential scanning calorimetry (DSC) (see ISO 11357-2)^[1] for this measurement.

DMA is used to determine the variation of the storage modulus, loss modulus and loss factor as a function of temperature and frequency. From these data, a value for the glass transition temperature is determined. Many types of commercial equipment are available that use this technique, and, in principle, it applies to all the loading modes described in ISO 6721-1.

The procedures minimize errors due to thermal lag of the specimen, which varies with the heating rate used, through assuming the specimen temperature is given by the measured oven temperature^[2]. This eliminates the need for the temperature of the specimen to be measured directly by, for example, a thermocouple embedded in the specimen.