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Plastics — Determination of dynamic mechanical properties —

Part 11: Glass transition temperature

Plastiques — Détermination des propriétés mécaniques dynamiques —

Partie 11: Température de transition vitreuse

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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

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Foreword

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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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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.

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.