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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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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 6721-11 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

ISO 6721 consists of the following parts, under the general title *Plastics — Determination of dynamic mechanical properties*:

— *Part 1: General principles*

— *Part 2: Torsion-pendulum method*

— *Part 3: Flexural vibration — Resonance-curve method*

— *Part 4: Tensile vibration — Non-resonance method*

— *Part 5: Flexural vibration — Non-resonance method*

— *Part 6: Shear vibration — Non-resonance method*

— *Part 7: Torsional vibration — Non-resonance method*

— *Part 8: Longitudinal and shear vibration — Wave-propagation method*

— *Part 9: Tensile vibration — Sonic-pulse propagation method*

— *Part 10: Complex shear viscosity using a parallel-plate oscillatory rheometer*

— *Part 11: Glass transition temperature*

— *Part 12: Compressive vibration — Non-resonance method*

Introduction

This part of ISO 6721 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) for this measurement.

DMA is used to determine the variation of the storage modulus, loss modulus and tan delta as a function of temperature and frequency. From these data, a value for the glass transition 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[1)]. This eliminates the need for the temperature of the specimen to be measured directly by, for example, a thermocouple embedded in the specimen.

1) See SIMS G.D., GNANIAH S.J.P., *Calibration Procedures for Increased Confidence in DMA Measurements*, ICCM 11, Edinburgh, July 2009.