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# Plastics — Determination of dynamic mechanical properties —

## Part 1: General principles

*Plastiques — Détermination des propriétés mécaniques dynamiques —*

*Partie 1: Principes généraux*



Reference number  
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## 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](http://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](http://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 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](http://www.iso.org/iso/foreword.html).

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

This fourth edition cancels and replaces the third edition (ISO 6721-1:2011), which has been technically revised. The main changes compared to the previous edition are as follows:

- the document has been revised editorially;
- normative references have been changed to undated and added as references into [Tables 4](#) and [5](#).

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 [www.iso.org/members.html](http://www.iso.org/members.html).

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## Introduction

The methods specified in the first nine parts of ISO 6721 can be used for determining storage and loss moduli of plastics over a range of temperatures or frequencies by varying the temperature of the specimen or the frequency of oscillation. Plots of the storage or loss moduli, or both, are indicative of viscoelastic characteristics of the specimen. Regions of rapid changes in viscoelastic properties at particular temperatures or frequencies are normally referred to as transition regions. Furthermore, from the temperature and frequency dependencies of the loss moduli, the damping of sound and vibration of polymer or metal-polymer systems can be estimated.

Apparent discrepancies may arise in results obtained under different experimental conditions. Without changing the observed data, reporting in full (as described in the various parts of ISO 6721) the conditions under which the data were obtained will enable apparent differences observed in different studies to be reconciled.

The definitions of complex moduli apply exactly only to sinusoidal oscillations with constant amplitude and constant frequency during each measurement. On the other hand, measurements of small phase angles between stress and strain involve some difficulties under these conditions. Because these difficulties are not involved in some methods based on freely decaying vibrations and/or varying frequency near resonance, these methods are used frequently (see ISO 6721-2 and ISO 6721-3). In these cases, some of the equations that define the viscoelastic properties are only approximately valid.