SLOVENSKI STANDARD
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Polimerni materiali - Pridobitev in predstavitev primerljivih podatkov, dobljenih pri različnih pogojih - 2. del: Toplotne lastnosti in lastnosti pri predelavi (ISO/DIS 11403-2:2021)

Plastics - Acquisition and presentation of comparable multipoint data - Part 2: Thermal and processing properties (ISO/DIS 11403-2:2021)

Kunststoffe - Ermittlung und Darstellung von vergleichbaren Vielpunkt-Kennwerten - Teil 2: Thermische und Verarbeitungseigenschaften (ISO/DIS 11403-2:2021)

Plastiques - Acquisition et présentation de données multiples comparables - Partie 2: Propriétés thermiques et caractéristiques relatives à la mise en oeuvre (ISO/DIS 11403-2:2021)

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Part 2:
Thermal and processing properties

Plastiques — Acquisition et présentation de données multiples comparables —

Partie 2: Propriétés thermiques et caractéristiques relatives à la mise en oeuvre

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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. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 61 *Plastics*, Subcommittee SC 2, *Mechanical behaviour*.

This third edition cancels and replaces the second edition (ISO 11403-2:2004), of which it constitutes a minor revision to amend “moulding temperature” to “mould temperature” in the last column in Table 1, to update the note in 6.2 and to update Annex A.

ISO 11403 consists of the following parts, under the general title *Plastics — Acquisition and presentation of comparable multipoint data:*

— *Part 1: Mechanical properties*

— *Part 2: Thermal and processing properties*

— *Part 3: Environmental influences on properties*

Introduction

This International Standard has been prepared because users of plastics find sometimes that available data cannot be used readily to compare the properties of similar materials, especially when the data have been supplied by different sources. Even when the same standard tests have been used, they often allow the adoption of a wide range of alternative test conditions, and the data obtained are not necessarily comparable. The purpose of this International Standard is to identify specific methods and conditions of test to be used for the acquisition and presentation of data in order that valid comparisons between materials can be made.

ISO 10350 is concerned with single-point data. Such data represent the most basic method for characterizing materials and are useful for the initial stages of material selection. The present International Standard identifies test conditions and procedures for the measurement and presentation of a more substantial quantity of data. Each property here is characterized by multipoint data which demonstrate how that property depends upon important variables such as time, temperature and environmental effects. Additional properties are also considered in this standard. These data therefore enable more discriminating decisions to be made regarding a material's suitability for a particular application. Some data are also considered adequate for undertaking predictions of performance in service and of optimum processing conditions for moulding a component, although it should be recognized that, for purposes of design, additional data will often be needed. One reason for this is that some properties are strongly dependent upon the physical structure of the material. The test procedures referred to in this standard employ, where possible, the multipurpose tensile bar, and the polymer structure in this test specimen may be significantly different from that in specific regions of a moulded component. Under these circumstances, therefore, the data will not be suitable for accurate design calculations for product performance. The material supplier should be consulted for specific information on the applicability of data.

ISO 10350 and the various parts of this International Standard together define the means for acquiring and presenting a core set of comparable data for use in material selection. Use of these standards should result in a rationalization of effort and a reduction of cost associated with provision of these data. Furthermore, reference to these standards will simplify the development of data models for the computerized storage and exchange of data concerning material properties.

Where appropriate, values for test variables have been specified by this standard. For some tests however, owing to the wide range of conditions over which different plastics perform, the standard gives guidance in the selection of certain test conditions so that they cover the operating range for that polymer. Because, in general, the properties and performance specifications for different polymers differ widely, there is no obligation to generate data under all the test conditions specified in this standard.

Data on a wide range of properties are needed to enable plastics to be selected and used in the large variety of applications to which they are suited. ISO standards describe experimental procedures which are suitable for the acquisition of relevant information on many of these properties. For other properties, however, ISO standards either do not exist or exhibit shortcomings that complicate their use at present for the generation of comparable data (see Annex A). The standard has therefore been divided into parts so that each part can be developed independently. In this way, additional properties can be included as new or revised standards become available.

Plastics — Acquisition and presentation of comparable multipoint data —

Part 2: Thermal and processing properties

1 Scope

This part of ISO 11403 specifies test procedures for the acquisition and presentation of multipoint data on the following thermal and processing properties of plastics:

— enthalpy/temperature curve;

— linear-expansion/temperature curve;

— melt shear viscosity.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 293, *Plastics — Compression moulding of test specimens of thermoplastic materials*

ISO 294-1, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 1: General principles, and moulding of multipurpose and bar test specimens*

ISO 295, *Plastics — Compression moulding of test specimens of thermosetting materials*

ISO 472, *Plastics — Vocabulary*

ISO 1133-1, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 1: Standard method*

ISO 1133-2, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 2: Method for materials sensitive to time-temperature history and/or moisture*

ISO 2818, *Plastics — Preparation of test specimens by machining*

ISO 10724-1, *Plastics — Injection moulding of test specimens of thermosetting powder moulding compounds (PMCs) — Part 1: General principles and moulding of multipurpose test specimens*

ISO 11357-3, *Plastics — Differential scanning calorimetry (DSC) — Part 3: Determination of temperature and enthalpy of melting and crystallization*

ISO 11359-2, *Plastics — Thermomechanical analysis (TMA) — Part 2: Determination of coefficient of linear thermal expansion and glass transition temperature*

ISO 11443, *Plastics — Determination of the fluidity of plastics using capillary and slit-die rheometers*

ISO 20753, *Plastics — Test specimens*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 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/

4 Specimen preparation

In the preparation of specimens by injection moulding, the procedures described in ISO 294-1 or ISO 10724-1 shall be used. For compression moulding, the procedures described in ISO 293 or ISO 295 shall be used. The method of moulding and the conditions will depend upon the material being moulded. If these conditions are specified in the International Standard appropriate to the material, then they shall be adopted, where possible, for the preparation of every specimen on which data are obtained using this part of ISO 11403. For those plastics for which moulding conditions have not yet been standardized, the conditions employed shall be within the range recommended by the polymer manufacturer and shall, for each of the processing methods, be the same for every specimen. Where moulding conditions are not stipulated in any International Standard, the values used for the parameters in Table 1 shall be recorded with the data for that material.

Where specimens are prepared by machining from sheet, the machining shall be performed in accordance with ISO 2818.

Table 1 — Moulding parameters

Type of moulding material	Moulding method and standard (where applicable)	Moulding parameters
Thermoplastic	Injection, ISO 294-1	Melt temperature
		Mould temperature
		Injection velocity
Thermoplastic	Compression, ISO 293	Moulding temperature
		Moulding time
		Cooling rate
		Demoulding temperature
Thermosetting	Injection, ISO 10724-1	Injection temperature
		Mould temperature
		Injection velocity
		Cure time
Thermosetting	Compression, ISO 295	Mould temperature
		Moulding pressure
		Cure time

5 Conditioning

Specimens shall be conditioned in accordance with the International Standard appropriate to the material. Reference to the use of any special conditioning shall be recorded with the data in the tables in Clause 7. If no materials standard is available, condition test specimens at 23 °C ± 2 °C and (50 ± 10) % RH for a minimum length of time of 88 h (see ISO 291).