Plast – Insamling och presentation av jämförbara data från flerpunktsmätningar – Del 1: Mekaniska egenskaper (ISO 11403-1:2001)

Plastics – Acquisition and presentation of comparable multipoint data – Part 1: Mechanical properties (ISO 11403-1:2001)

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This European Standard was approved by CEN on 12 December 2002.

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Foreword

The text of ISO 11403-1:2001 has been prepared by Technical Committee ISO/TC 61 "Plastics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 11403-1:2003 by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2003, and conflicting national standards shall be withdrawn at the latest by September 2003.

This document supersedes EN ISO 11403-1:1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 11403-1:2001 has been approved by CEN as EN ISO 11403-1:2003 without any modifications.

NOTE Normative references to International Standards are listed in Annex ZA (normative).
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 1: Mechanical properties

1 Scope

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

- Dynamic modulus
- Tensile properties at constant test speed
  - Ultimate stress and strain
  - Tensile stress-strain curves
- Tensile creep
- Charpy impact strength
- Puncture impact behaviour

The test methods and test conditions apply predominantly to those plastics that can be injection- or compression-moulded or prepared as sheets of specified thickness from which specimens of the appropriate size can be machined.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 11403. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 11403 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.


ISO 293:1986, Plastics — Compression moulding test specimens of thermoplastic materials

ISO 294-3:— 1), Plastics — Injection moulding of test specimens of thermoplastic materials — Part 3: Small plates

ISO 295:— 2), Plastics — Compression moulding of test specimens of thermosetting materials


ISO 899-1:— 3), Plastics — Determination of creep behaviour — Part 1: Tensile creep

ISO 2818:1994, Plastics — Preparation of test specimens by machining

ISO 3167:— 4), Plastics — Multipurpose test specimens


ISO 10724-1:1998, Plastics — Injection moulding of test specimens of thermosetting powder moulding compounds (PMCs) — Part 1: General principles and moulding of multipurpose test specimens

ISO 10724-2:1998, Plastics — Injection moulding of test specimens of thermosetting powder moulding compounds (PMCs) — Part 2: Small plates

3 Term and definition

For the purposes of this part of ISO 11403, the following term and definition apply.

3.1 multipoint data
data characterizing the behaviour of a plastics material by means of a number of test results for a property measured over a range of test conditions

4 Specimen preparation

In the preparation of specimens by injection or compression moulding, the procedures described in ISO 293, ISO 294-1 and 294-3, ISO 295 or ISO 10724-1 and 10724-2 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.

1) To be published. (Revision of ISO 294-3:1996)
2) To be published. (Revision of ISO 295:1991)
3) To be published. (Revision of ISO 899-1:1993)
4) To be published. (Revision of ISO 3167:1993)