
**Plastics — Acquisition and presentation
of comparable single-point data —**

**Part 1:
Moulding materials**

*Plastiques — Acquisition et présentation de caractéristiques
intrinsèques comparables —*

Partie 1: Matériaux pour moulage

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 10350-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

This second edition cancels and replaces the first edition (ISO 10350-1:1998), which has been technically revised.

ISO 10350 consists of the following parts, under the general title *Plastics — Acquisition and presentation of comparable single-point data*:

- Part 1: *Moulding materials*
- Part 2: *Long-fibre-reinforced plastics*

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Introduction

ISO 10350 has been prepared because users of plastics find that available data cannot always be readily used 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 tests employed to present “single-point” data on the limited range of properties commonly included in data sheets and used for the preliminary selection of materials. Such data represent the most basic approach to the specification of properties of materials, and the standard thus facilitates the first steps towards more efficient selection and use of plastics in the many applications to which they are suited.

Complementary International Standards (ISO 11403-1, ISO 11403-2 and ISO 11403-3)¹⁾ are concerned with the standardized acquisition and presentation of multipoint data, to demonstrate how properties vary with important factors such as time, temperature and the presence of particular natural and chemical environments. In these standards, some additional properties are included. Their use will provide a more substantial database than one containing only single-point data, and so will enable improved assessment of the fitness of a material for any particular application. In addition, ISO 11403-1, which deals with mechanical properties, assists predictions of the performance of components and ISO 11403-2, covering thermal and processing properties, aids predictions of melt-flow behaviour during manufacturing. ISO 11403-3 is concerned with environmental influences on properties, and other parts may be prepared to cover additional properties.

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- 1) ISO 11403-1, *Plastics — Acquisition and presentation of comparable multipoint data — Part 1: Mechanical properties*
 ISO 11403-2, *Plastics — Acquisition and presentation of comparable multipoint data — Part 2: Thermal and processing properties*
 ISO 11403-3, *Plastics — Acquisition and presentation of comparable multipoint data — Part 3: Environmental influences on properties*

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Plastics — Acquisition and presentation of comparable single-point data —

Part 1: Moulding materials

1 Scope

ISO 10350 identifies specific test procedures for the acquisition and presentation of comparable data for certain basic properties of plastics. In general, each property is specified by a single experimental value, although in certain cases properties are represented by two values obtained under different test conditions. The properties included are those presented conventionally in manufacturers' data sheets. This part of ISO 10350 applies predominantly to unreinforced and reinforced thermoplastic and thermosetting materials that may be injection- or compression-moulded or prepared as sheets of specified thickness. Part 2 of ISO 10350 deals specifically with long- or continuous-fibre-reinforced plastics. For the purposes of ISO 10350, long-fibre-reinforced plastics are considered to have fibre lengths greater than 7,5 mm prior to moulding.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 62, *Plastics — Determination of water absorption*

ISO 75-1, *Plastics — Determination of temperature of deflection under load — Part 1: General test method*

ISO 75-2, *Plastics — Determination of temperature of deflection under load — Part 2: Plastics and ebonite*

ISO 178, *Plastics — Determination of flexural properties*

ISO 179-1, *Plastics — Determination of Charpy impact properties — Part 1: Non-instrumented impact test*

ISO 179-2, *Plastics — Determination of Charpy impact properties — Part 2: Instrumented impact test*

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

ISO 294-4, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 4: Determination of moulding shrinkage*

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

ISO 306, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST)*

ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

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

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

ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method*

ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method*

ISO 1183-3, *Plastics — Methods for determining the density of non-cellular plastics — Part 3: Gas pycnometer method*

ISO 2577, *Plastics — Thermosetting moulding materials — Determination of shrinkage*

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

ISO 3167, *Plastics — Multipurpose test specimens*

ISO 4589-2, *Plastics — Determination of burning behaviour by oxygen index — Part 2: Ambient-temperature test*

ISO 6603-2, *Plastics — Determination of puncture impact behaviour of rigid plastics — Part 2: Instrumented impact testing*

ISO 8256, *Plastics — Determination of tensile-impact strength*

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

ISO 11357-2, *Plastics — Differential scanning calorimetry (DSC) — Part 2: Determination of glass transition temperature*

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*

IEC 60093, *Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60243-1, *Electrical strength of insulating materials — Test methods — Part 1: Tests at power frequencies*

IEC 60250, *Recommended methods for the determination of the permittivity and dielectric dissipation factor of electrical insulating materials at power, audio and radio frequencies including metre wavelengths*

IEC 60296, *Fluids for electrotechnical applications — Unused mineral insulating oils for transformers and switchgear*

IEC 60695-11-10, *Fire hazard testing — Part 11-10: Test flames — 50 W horizontal and vertical flame test methods*

IEC 60695-11-20, *Fire hazard testing — Part 11-20: Test flames — 500 W flame test methods*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

single-point data

data characterizing a plastics material by means of those property tests in which important aspects of performance can be described with single-value results.

4 Specimen preparation and conditioning

In the preparation of specimens by injection moulding, the procedures described in ISO 294-1 and ISO 294-3 or ISO 10724-1 and ISO 10724-2 shall be used. For compression moulding, the procedures described in ISO 293 or ISO 295 shall be used. The moulding method 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 for the preparation of every specimen on which data are obtained using this part of ISO 10350. 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 single-point data for that material. Where specimens are prepared by machining from sheet, the machining shall be performed in accordance with ISO 2818 and the dimensions of the specimen shall comply with those for the appropriate specimen in Table 2.

For materials that have properties that are not significantly sensitive to any absorbed water, specimens shall be conditioned in accordance with the International Standard appropriate to the material concerned. If no materials standard is available, condition test specimens at $23\text{ °C} \pm 2\text{ °C}$ and $(50 \pm 10)\text{ % RH}$ for a minimum length of time of 88 h (see ISO 291).

For those materials having properties that are significantly dependent upon the concentration of any absorbed water, data shall be presented both for material that is dry and also for material that is in equilibrium with an atmosphere of 50 % RH at 23 °C but with the following exceptions (see Table 2):

Rheological properties, 1.1 to 1.6	dry only
Creep modulus, 2.8 and 2.9	50 % RH only
Thermal properties, 3.1 to 3.8	dry only
Surface resistivity and comparative tracking index, 4.6 and 4.9	50 % RH only

For these materials, consult the relevant materials standard for procedures for conditioning specimens to achieve material that is dry or in equilibrium under 50 % RH. Following such conditioning, all test specimens shall be stored at $23\text{ °C} \pm 2\text{ °C}$ for a minimum of 16 h before testing. The storage atmosphere shall then be either dry or at 50 % RH, depending upon the condition of the specimen.