INTERNATIONAL STANDARD

ISO 1110

Third edition
1995-02-01

Plastics — Polyamides — Accelerated conditioning of test specimens

Plastiques — Polyamides — Conditionnement accéléré d'éprouvettes

Reference number
ISO 1110:1995(E)

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.

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.

International Standard ISO 1110 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This third edition cancels and replaces the second edition (ISO 1110:1987), which has been technically revised.

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Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Introduction

Various properties of polyamides (PA) depend upon their moisture content. Reproducible values of these properties can only be obtained with specimens having a specified moisture content. Such specimens are obtained by conditioning, i.e. by allowing them to reach equilibrium in an atmosphere with a specified temperature and relative humidity.

The rate of moisture absorption and, therefore, the rate of conditioning, is a function of the temperature. This rate is very low at room temperature. For example, a 4 mm thick test specimen of PA66 requires more than a year to attain its equilibrium moisture content in standard atmosphere 23/50 (see ISO 291). To condition specimens in a relatively short period of time, higher temperatures are required. Such a method for accelerated conditioning is presented in this International Standard.

Plastics — Polyamides — Accelerated conditioning of test specimens

1 Scope

This International Standard describes a method for the accelerated conditioning of test specimens of polyamides and copolyamides. It is applicable to grades containing fillers and other additives, but not to grades containing more than 2 % (*m*/*m*) extractables.

The equilibrium moisture content attained by this method is close to the equilibrium moisture content obtained in standard atmosphere 23/50. The values of mechanical properties obtained after accelerated conditioning in accordance with this method may differ slightly from those obtained after conditioning in standard atmosphere 23/50.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 291:1977, *Plastics — Standard atmospheres for conditioning and testing.*

ISO 483:1988, *Plastics — Small enclosures for conditioning and testing using aqueous solutions to maintain relative humidity at constant value.*

3 Principle

The test specimens are stored in an atmosphere of 70 °C ± 1 °C and (62 ± 1) % relative humidity (psychrometric temperature difference of 10 °C ± 0,3 °C) until moisture absorption by the specimen has reached at least 95 % of its equilibrium level.

4 Apparatus

4.1 Cabinet, with closed air circulation by a fan, capable of maintaining a temperature of 70 °C within a tolerance of ± 1 °C and a psychrometric temperature difference of 10 °C within a tolerance of ± 0,3 °C, corresponding to a relative humidity of (62 ± 1) %.

4.2 If a cabinet as described in 4.1 is not available:

4.2.1 Oven, capable of maintaining the temperature at 70 °C ± 1 °C.

4.2.2 Closed container, for example a desiccator, partially filled with a saturated aqueous solution of potassium iodide in accordance with the general procedure specified in ISO 483.

Leave excess salt in contact with the solution throughout the conditioning. The specimens may become slightly discoloured by the absorption of iodine.

4.3 Analytical balance, accurate to 0,1mg.

5 Procedure

Place the test specimens in the preheated cabinet (4.1) or in the closed container (4.2.2) in the oven (4.2.1). By suitable means, for example racks, ensure that the surface of each specimen is almost completely exposed to the surrounding atmosphere.

After conditioning for a period of time t_1, as indicated in table 1, remove the specimens from the cabinet or the container, allow them to cool for 1 h in standard

atmosphere 23/50 (see ISO 291) and weigh them to the nearest 0,1 mg. Thereafter, continue the accelerated conditioning of the specimens and repeat the weighings, as above, at intervals of time t_2 as indicated in table 1. The periods of time t_1 and t_2 shall not be less than 1 day.

When three consecutive weighings lie within a tolerance of 0,1 %, the conditioning is assumed to be completed (see note 1). Place the specimens in standard atmosphere 23/50 for at least 1 h before testing.

In cases of PA not mentioned in table 1, use the values of t_1 and t_2 indicated for group II, unless a plot of the mass of the specimens versus the conditioning time shows that the values for group I may be used.

NOTE 1 Under these conditions, the specimens will have acquired a moisture content equal to at least 95 % of the equilibrium value. A prolongation of the conditioning beyond this point will have no noticeable effect on the properties of the specimens.

6 Reference procedure

In cases of dispute, the test specimens shall be conditioned in the cabinet (4.1).

Table 1 — Periods of time for accelerated conditioning

Group	PA	t_1 (days)		t_2 (days)
		in a cabinet (4.1)	in a container (4.2.2)	
I	6, 66, 11, 12, 6/66, 46	$\geqslant \frac{1}{3} h^2$	$\geqslant h^2$	$\geqslant \frac{1}{8} h^2$
II	69, 610, 612, IND/INDT, 6I/6T	$\geqslant \frac{2}{3} h^2$	$\geqslant 2h^2$	$\geqslant \frac{1}{4} h^2$

NOTE — h is the thickness, in millimetres, of the specimens.

ICS 83.080.20

Descriptors: plastics, polyamide, test specimens, specimen preparation, conditioning.

Price based on 2 pages