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Plastics — Determination of migration of plasticizers

Plastiques — Détermination de la migration des plastifiants

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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Foreword

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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).

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 61, *Plastics*, Subcommittee SC 6, *Ageing, chemical and environmental resistance*.

This third edition cancels and replaces the second edition (ISO 177:1988), of which it constitutes a minor revision with the following change:

— the normative references have been updated.

Plastics — Determination of migration of plasticizers

1 Scope

This document specifies a method for the determination of the tendency of plasticizers to migrate from plastics in which they are contained into other materials or other plastics when they are brought into close contact.

NOTE 1 The surfaces into which the migration can proceed can also consist of organic surface coatings, such as lacquers.

This test is suitable

a) for evaluating the tendency displayed by plastics, particularly in the form of films and sheets, to lose certain of their liquid constituents when they are brought into contact with materials that have an affinity for plasticizers, and

b) for studying the tendency to migrate of plasticizers contained in a resin or a series of resins, in one or more concentrations.

In case b), standard compounds are prepared on the basis of a well-characterized resin with well-defined ratios of plasticizer to resin.

NOTE 2 When the absorbent sheets themselves contain a substance capable of migrating, simultaneous migrations can occur from the test specimens into the absorbent sheets and vice versa.

The results may also be affected by the migration of other constituents of the plastic material (for example, oligomers) or by the loss of any volatile constituents other than plasticizers from the plastic material or the absorbent layer.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 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*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
migration of plasticizers
loss of mass of a sheet of plasticized plastic when placed in close contact between two absorbent sheets of another material, under specified conditions

4 Principle

A test specimen cut from a sheet or plate of the material or from the finished product to be tested is placed in close contact with two sheets, capable of absorbing plasticizers. It is then subjected to heating under defined conditions. The loss in mass of the test specimen, theoretically equal to the increase in mass of the sheets, is a measure of the migration of the plasticizer.

5 Apparatus

5.1 **Analytical balance**, accurate to 0,001 g.

5.2 **Micrometer**, accurate to 0,01 mm.

5.3 **Air circulating oven**, capable of maintaining the temperature to within ±2 °C, in the range 50 °C to 100 °C.

5.4 **Glass plates**, with plane surfaces, of sufficient size to cover the absorbent backing discs (5.6).

5.5 **Weights**, of 5 kg.

5.6 **Absorbent backing discs**, with an affinity for plasticizers, 60 mm ± 1 mm in diameter and at least 0,5 mm in thickness.

The materials recommended for the test are:

— a standard rubber (according to ISO 4649), or

— polyethylene without additive, or

— polyvinyl acetate without plasticizer.

In the case of a particular application, an absorbent backing disc of the material with which the plastic under test will be in contact when in service shall be used. The surface of the absorbent backing disc shall be sufficiently smooth to ensure continuous contact with the test specimen.

6 Test specimens

6.1 The test specimens shall be in the form of discs 50 mm ± 1 mm in diameter and at least 0,5 mm in thickness, cut from a compression-moulded (in accordance with ISO 293) or injection-moulded (in accordance with ISO 294-1 and ISO 294-3) sheet of suitable thickness.

The surface of the test specimens shall be sufficiently smooth to ensure continuous contact with the absorbent backing discs (5.6).

6.2 In the case of films, the test specimen of not less than 0,5 mm thickness shall be produced by pressing an adequate number of films at a suitable temperature for about 1 min.

6.3 If the test is intended to determine the migration from a finished product, the latter shall be tested at a uniform thickness.