Plastics - Determination of water absorption

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EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN ISO 62:2001 sisaldab Euroopa standardi EN ISO 62:1999 ingliskeelset teksti. Käesolev dokument on jõustatud 19.10.2001 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN ISO 62:2001 consists of the English text of the European standard EN ISO 62:1999. This document is endorsed on 19.10.2001 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This standard describes a procedure for determination of moisture absorption properties in the through-the-thickness direction for solid mateterials in flat or curved form.This standard also describes procedures for determining the amount of water absorbed by plastic specimens with precisely defined dimensions exposed to precisely defined conditions where test specimens are immersed or subjected to humid air.	**Scope:** This standard describes a procedure for determination of moisture absorption properties in the through-the-thickness direction for solid mateterials in flat or curved form.This standard also describes procedures for determining the amount of water absorbed by plastic specimens with precisely defined dimensions exposed to precisely defined conditions where test specimens are immersed or subjected to humid air.

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Võtmesõnad: gravimetric analysis, physical tests, plastics, tests, water absorption tests

EUROPEAN STANDARD
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English version

Plastics

Determination of water absorption
(ISO 62 : 1999)

Plastiques – Détermination de l'absorption d'eau (ISO 62 : 1999)

Kunststoffe – Bestimmung der Wasseraufnahme (ISO 62 : 1999)

This European Standard was approved by CEN on 1999-01-17.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN ISO 62 : 1999 E

Foreword

International Standard

ISO 62:1999 Plastics - Determination of water absorption,

which was prepared by ISO/TC 61 'Plastics' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 249 'Plastics', the Secretariat of which is held by IBN, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by August 1999 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 62:1999 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

Introduction

Plastics exposed to water are subject to several different effects:

a) dimensional changes (e.g. swelling) caused by absorption of water;

b) extraction of water-soluble components; and

c) changes in other properties.

However, exposure to humidity, immersion, and exposure to boiling water can result in distinctly different material responses. The equilibrium moisture content can be used to compare the amount of water absorbed by different types of plastics when they are exposed to moisture. Moisture content determined under non-equilibrium conditions can be used to compare different batches of the same material and to determine the diffusion constant of the material when determined under carefully controlled non-equilibrium exposure conditions to moisture and when using plastic specimens of defined dimensions.

1 Scope

1.1 This International Standard describes a procedure for determining the moisture absorption properties in the "through-the-thickness" direction of flat or curved-form solid plastics. This International Standard also describes procedures for determining the amount of water absorbed by plastic specimens of defined dimensions, when immersed in water or when subjected to humid air under controlled conditions. The "through-the-thickness" moisture diffusion coefficient can be determined for single-phase material by assuming Fickian diffusion behaviour with constant moisture absorption properties through the thickness of the test specimen. This model is valid for homogeneous materials and for reinforced polymer-matrix composites tested below their glass transition temperature. However, some two-phase matrices such as hardened epoxies may require a multi-phase absorption model which is not covered by this International Standard.

1.2 Ideally the best comparison of the water absorption properties and/or diffusion coefficients of materials should be carried out only using the equilibrium moisture content of plastics exposed to identical conditions. The comparison of materials using properties at moisture equilibrium does not assume, and is therefore not limited to, single-phase Fickian diffusion behaviour.

1.3 Alternatively, water absorption of plastic specimens of defined dimensions exposed to immersion or humidity under controlled conditions but for an arbitrary time period can be used to compare different batches of the same material or for quality control tests of a given material. For this type of comparison, it is essential that all test specimens be of identical dimensions and, as nearly as possible, have the same physical attributes, e.g. surface smoothness, internal stresses, etc. However, moisture equilibrium is not reached under these conditions. Therefore, results from this type of test cannot be used to compare the water absorption properties of different types of plastics. For the more reliable results, simultaneous tests are recommended.

1.4 The results obtained using the methods described in this International Standard are applicable to most plastics but are not applicable to cellular plastics, granulates, or powders which can show additional absorption and capillary effects. Plastics exposed to moisture under controlled conditions for defined periods of time provide relative comparisons between them. The tests described for determination of diffusion coefficient may not be applicable to all plastics. Plastics that cannot retain their shape when immersed in boiling water should not be compared using method 2 in 6.3.

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 175:—[1)], *Plastics — Determination of the effects of liquid chemicals, including water.*

ISO 294-3:1996, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 3: Small plates.*

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

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1) To be published. (Revision of ISO 175:1981)