

Materials and articles in contact with foodstuffs - Plastics - Part 4: Test methods for overall migration into olive oil by cell

Materials and articles in contact with foodstuffs -
Plastics - Part 4: Test methods for overall migration
into olive oil by cell

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

| | |
|--|---|
| <p>Käesolev Eesti standard EVS-EN 1186-4:2002 sisaldab Euroopa standardi EN 1186-4:2002 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 16.05.2002 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p> | <p>This Estonian standard EVS-EN 1186-4:2002 consists of the English text of the European standard EN 1186-4:2002.</p> <p>This document is endorsed on 16.05.2002 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p> |
|--|---|

| | |
|---|---|
| <p>Käsitlusala:</p> <p>This Part of this European Standard specifies test methods for the determination of the overall migration into fatty food simulants, from one surface only of plastics in the form of sheet and film at temperatures above 20 °C and up to, but not including, 100 °C for selected times. This method is most suitable for plastics in the form of films and sheets, but is particularly applicable to those materials consisting of more than one layer or surfaces that differ in their migration characteristics, which have to be tested with food simulant in contact with the surface which is intended to come into contact with foodstuffs. The test method described is applicable to most types of plastics, although there are some plastics for which it is known not to be applicable.</p> | <p>Scope:</p> <p>This Part of this European Standard specifies test methods for the determination of the overall migration into fatty food simulants, from one surface only of plastics in the form of sheet and film at temperatures above 20 °C and up to, but not including, 100 °C for selected times. This method is most suitable for plastics in the form of films and sheets, but is particularly applicable to those materials consisting of more than one layer or surfaces that differ in their migration characteristics, which have to be tested with food simulant in contact with the surface which is intended to come into contact with foodstuffs. The test method described is applicable to most types of plastics, although there are some plastics for which it is known not to be applicable.</p> |
|---|---|

ICS 67.250

Võtmesõnad: area, foil, food packages, food products, food-container c, materials, materials in contact with food, materials specification, migration, objects, olive oil, plastic containers, plastic films, plastics, sheets, storage, surfaces, testing

Hinnagrupp P

English version

**Materials and articles in contact with foodstuffs - Plastics - Part
4: Test methods for overall migration into olive oil by cell**

Matériaux et objets en contact avec les denrées
alimentaires - Matière plastique - Partie 4: Méthodes
d'essai pour la migration globale dans l'huile d'olive en
cellule

Werkstoffe und Gegenstände in Kontakt mit Lebensmitteln
- Kunststoffe - Teil 4: Prüfverfahren für die
Gesamtmigration in Olivenöl mittels Zelle

This European Standard was approved by CEN on 4 January 2002.

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 Management Centre or to any CEN member.

This European Standard exists 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

| | page |
|--|------|
| Foreword | 3 |
| 1 Scope | 5 |
| 2 Normative references | 5 |
| 3 Principle | 5 |
| 4 Reagents | 6 |
| 5 Apparatus | 7 |
| 6 Preparation of test specimens | 9 |
| 7 Procedure | 9 |
| 8 Expression of results | 16 |
| 9 Test report | 17 |
| Annex A (normative) Determination of the suitability of olive oil as the fatty food simulant and of triheptadecanoin as the internal standard | 18 |
| Annex B (normative) Determination of the need for sample conditioning | 20 |
| Annex C (normative) Determination of the need for sample conditioning and determination of the mass of moisture sensitive test specimens, by vacuum drying | 21 |
| Annex D (normative) Determination of change in moisture content of test specimens by measurement of the transfer of water to, or from olive oil, by Karl Fischer titration | 23 |
| Annex E (informative) Typical chromatograms and calibration graph | 25 |
| Annex F (informative) Precision data | 28 |
| Annex ZA (informative) Relationship of this European Standard with Council Directive 89/109/EEC and Commission Directive 90/128/EEC and associated Directives | 29 |
| Bibliography | 31 |

Foreword

This document EN 1186-4:2002 has been prepared by Technical Committee CEN/TC 194 "Utensils in contact with food", the secretariat of which is held by BSI.

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 October 2002, and conflicting national standards shall be withdrawn at the latest by October 2002.

This document supersedes ENV 1186-4:1994.

This European Standard is one of a series of methods of test for plastics materials and articles in contact with foodstuffs.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

For relationship with EC Directive(s), see informative annex ZA, which is an integral part of this document.

At the time of preparation and publication of this standard the European Union legislation relating to plastics materials and articles intended to come into contact with foodstuffs is incomplete. Further Directives and amendments to existing Directives are expected which could change the legislative requirements which this standard supports. It is therefore strongly recommended that users of this standard refer to the latest relevant published Directive(s) before commencement of any of the test or tests described in this standard.

EN 1186-4 should be read in conjunction with EN 1186-1.

Further Parts of this standard have been prepared concerned with the determination of overall migration from plastics materials into food simulants. Their titles are as follows:

EN 1186 Materials and articles in contact with foodstuffs- Plastics-

| | |
|---------|--|
| Part 1 | Guide to the selection of conditions and test methods for overall migration |
| Part 2 | Test methods for overall migration into olive oil by total immersion |
| Part 3 | Test methods for overall migration into aqueous food simulants by total immersion |
| Part 5 | Test methods for overall migration into aqueous food simulants by cell |
| Part 6 | Test methods for overall migration into olive oil using a pouch |
| Part 7 | Test methods for overall migration into aqueous food simulants using a pouch |
| Part 8 | Test methods for overall migration into olive oil by article filling |
| Part 9 | Test methods for overall migration into aqueous food simulants by article filling |
| Part 10 | Test methods for overall migration into olive oil (modified method for use in cases where incomplete extraction of olive oil occurs) |
| Part 11 | Test methods for overall migration into mixtures of ¹⁴ C-labelled synthetic triglyceride |
| Part 12 | Test methods for overall migration at low temperatures |

| | |
|---------|--|
| Part 13 | Test methods for overall migration at high temperatures |
| Part 14 | Test methods for 'substitute tests' for overall migration from plastics intended to come into contact with fatty foodstuffs using test media iso-octane and 95 % ethanol |
| Part 15 | Alternative test methods to migration into fatty food simulants by rapid extraction into iso-octane and/or 95 % ethanol |

Annexes A, B, C and D to this standard are normative where applicable. The annexes E and F are informative.

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, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This Part of this European Standard specifies test methods for the determination of the overall migration into fatty food simulants, from one surface only of plastics in the form of sheet and film at temperatures above 20 °C and up to, but not including, 100 °C for selected times.

This method is most suitable for plastics in the form of films and sheets, but is particularly applicable to those materials consisting of more than one layer or surfaces that differ in their migration characteristics, which have to be tested with food simulant in contact with the surface which is intended to come into contact with foodstuffs.

NOTE This test method has been written for use with the fatty food simulant, olive oil. The test method can also be used with appropriate modifications with 'other fatty food simulants' called simulant D - a synthetic mixture of triglycerides, sunflower oil and corn oil. These other fatty food simulants will produce different chromatograms for the simulant methyl esters to those of the methyl esters of olive oil. Select suitable chromatogram peaks of the methyl esters of the other fatty food simulants for the quantitative determination of the simulant extracted from the test specimens.

The test method described is applicable to most types of plastics, although there are some plastics for which it is known not to be applicable.

2 Normative references

This European Standard incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to and revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1186-1:2002, *Materials and articles in contact with foodstuffs – Plastics – Part 1: Guide to the selection of conditions and test methods for overall migration*.

ISO 648, *Laboratory glassware - One mark pipettes*.

ISO 4788, *Laboratory glassware – Graduated measuring cylinders*.

3 Principle

The overall migration from a sample of the plastics is determined as the loss in mass per unit of surface area intended to come into contact with foodstuffs.

The selection of the conditions of test will be determined by the conditions of use, see clauses 4, 5 and 6 of EN 1186-1:2002.

Test specimens of known mass are exposed in a cell to olive oil for the exposure time, at temperatures above 20 °C and below 100 °C, then taken from the cell, blotted to remove oil adhering to the surface, and reweighed.

The specimens will usually retain absorbed olive oil that extracted and determined quantitatively by means of gas chromatography after conversion to methyl esters. Methylation is carried out by reacting a boron trifluoride/methanol complex with fatty acids formed by hydrolysing the oil with potassium hydroxide. An internal standard, triheptadecanoin, is added prior to the extraction of the absorbed olive oil from the test specimens. This ensures that any active or extractable components of the plastics react with the internal standard, as well as with the extracted olive oil. The internal standard is also subjected to the hydrolysis and methylation reactions, providing compensation for any inefficiencies in the hydrolysis and methylation processes.

Migration into the olive oil is calculated by subtracting the mass of olive oil retained by the test specimen from the