

Materials and articles in contact with foodstuffs — Plastics —

Part 8: Test methods for overall migration into olive oil by article filling

UDC 664:678-4:620.1

Cooperating organizations

The European Committee for Standardization (CEN), under whose supervision this European Prestandard was prepared, comprises the national standards organizations of the following countries:

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This Draft for Development, having been prepared under the direction of the Consumer and Contract Goods Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 November 1994

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National foreword

This Draft for Development has been prepared under the direction of the Consumer and Contract Goods Standards Policy Committee and is the English language version of European Prestandard ENV 1186-8:1994 *Materials and articles in contact with foodstuffs — Plastics — Part 8: Test methods for overall migration into olive oil by article filling*, published by the European Committee for Standardization (CEN).

This publication is not to be regarded as a British Standard

It is being issued in the Draft for Development series of publications and is of a provisional nature because more experience of the methods described is required. It should be applied on this provisional basis so that information and experience of its practical application may be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion to a European Standard. A review of this publication will be initiated 2 years after its publication by the European organization so that a decision can be taken on its status at the end of its three-year life. The commencement of the review period will be notified by an announcement in *BSI News*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European Standard, to extend the life of the prestandard or to withdraw it. Comments should be sent in writing to the Secretary of BSI Technical Committee CCM/47 at BSI, 389 Chiswick High Road, London W4 4AL giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

CAUTION. Attention is drawn to the Health and Safety at Work etc. Act 1974, and the need for ensuring that the method specified in this Draft for Development is carried out with suitable precautions.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, and inside front cover, pages i and ii, the ENV title page, pages 2 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Materials and articles in contact with foodstuffs — Plastics — Part 8: Test methods for overall migration into olive oil by article filling

Matériaux et objets en contact avec les
denrées alimentaires — Matière plastique —
Partie 8: Méthodes d'essai pour la migration
globale dans l'huile d'olive par remplissage

Werkstoffe und Gegenstände in Kontakt mit
Lebensmitteln — Kunststoffe —
Teil 8: Prüfverfahren des Gesamtmigration in
Olivenöl durch Füllen des Gegenstandes

This European Prestandard (ENV) was approved by CEN on 1993-03-09 as a prospective standard for provisional application. The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard (EN).

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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

CEN

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

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Foreword

This Part of this European Prestandard has been prepared by a Subcommittee (SC1) of TC194 “*Utensils in contact with food*” as one of a series of methods of test for plastics materials and articles in contact with foodstuffs.

Further Parts of this prestandard have been prepared, and others are in preparation, concerned with the determination of overall migration from plastics materials into food simulants.

Their titles are as follows:

ENV 1186-1, *Guide to the selection of conditions and test methods for overall migration.*

ENV 1186-2, *Test methods for overall migration into olive oil by total immersion.*

ENV 1186-3, *Test methods for overall migration into aqueous simulants by total immersion.*

ENV 1186-4, *Test methods for overall migration into olive oil by cell.*

ENV 1186-5, *Test methods for overall migration into aqueous food simulants by cell.*

ENV 1186-6, *Test methods for overall migration into olive oil using a pouch.*

ENV 1186-7, *Test methods for overall migration into aqueous simulants using a pouch.*

ENV 1186-9, *Test methods for overall migration into aqueous food simulants by article filling.*

ENV 1186-10, *Test methods for overall migration into olive oil (modified method for use in cases where incomplete extraction of olive oil occurs).*

Further Parts in preparation are as follows:

ENV 1186-11, *Test methods for overall migration into mixtures of ¹⁴C-labelled synthetic triglyceride.*

ENV 1186-12, *Test methods for overall migration at low temperatures.*

ENV 1186-13, *Test methods for overall migration at high temperatures.*

ENV 1186-8 should be read in conjunction with ENV 1186-1.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to announce this European Prestandard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

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1 Scope

This Part of this European Prestandard describes a method of test for the determination of the overall migration from one surface only of the plastics in the form of finished articles, which are intended to come into contact with a fatty foodstuff, by filling the finished article with olive oil and leaving for 10 days, 24 h or 2 h at 40 °C or for 2 h at 70 °C.

Testing samples by this method enables testing of non-homogeneous articles providing that they are not too large.

This method is most suitable for plastics in the form of containers and articles that can be filled.

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, see ENV 1186-1.

2 Normative references

This European Prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 648:1977, *Laboratory glassware — One mark pipettes*.

ISO 4788:1980, *Laboratory glassware — Graduated measuring cylinders*.

ENV 1186-1, *Guide to the selection of conditions and test methods for overall migration*.

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 clause 3 of ENV 1186-1.

Test specimens of known mass are filled with olive oil and stored for 10 days, 24 h or 2 h at 40 °C or 2 h at 70 °C, then emptied, blotted to remove olive oil adhering to the surface and reweighed.

The specimens will usually retain absorbed olive oil which is 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 mass of the test specimen after removing the olive oil, and then subtracting this mass from the initial mass of the specimen.

The total loss in mass is expressed in milligrams per square decimetre of surface area of the specimen and the overall migration is reported as the mean of a minimum of three determinations on separate test specimens.

To allow for inaccuracies which may arise during the procedure and which may be difficult to detect, due for example to contamination or loss of oil during the sample handling stages, quadruplicate determinations are carried out on the sample allowing for the result from one specimen to be discarded.

This method includes variations which are applicable to certain plastics and to experienced laboratories.

4 Reagents

All reagents shall be recognised analytical quality, unless otherwise specified.

4.1 Olive oil, Simulant D as specified in 4.2 of ENV 1186-1.

4.2 Extraction solvent (see 7.1 of ENV 1186-1).

4.2.1 Pentane 98 % (mixed isomers) boiling point 36 °C

NOTE 1 Pentane is a very volatile and highly flammable solvent. Care should therefore be taken when handling this solvent to prevent contact with sources of ignition. It is not recommended that extractions with this solvent be left unattended, particularly overnight.

NOTE 2 Due to the low boiling point of this solvent, cooled condenser water may be required to prevent undue loss of the solvent from the condenser.

OR