

SLOVENSKI STANDARD

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Materiali in predmeti v stiku z živilu - Polimerni materiali - 5. del: Preskusne metode za celotno migracijo v vodne modelne raztopine z migracijsko celico

Materials and articles in contact with foodstuffs - Plastics - Part 5: Test methods for overall migration into aqueous food simulants by cell

Werkstoffe und Gegenstände in Kontakt mit Lebensmitteln - Kunststoffe - Teil 5: Prüfverfahren für die Gesamtmigration in wässrigen Prüflebensmitteln mittels Zellen

Matériaux et objets en contact avec les denrées alimentaires - Matière plastique - Partie 5: Méthodes d'essai pour la migration globale dans les liquides simulateurs aqueux en cellule

Ta slovenski standard je istoveten z: EN 1186-5:2002

ICS:

67.250	Materiali in predmeti v stiku z živilu	Materials and articles in contact with foodstuffs
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1186-5

April 2002

ICS 67.250

Supersedes ENV 1186-5:1994

English version

**Materials and articles in contact with foodstuffs - Plastics - Part
5: Test methods for overall migration into aqueous food
simulants by cell**

Matériaux et objets en contact avec les denrées
alimentaires - Matière plastique - Partie 5: Méthodes
d'essai pour la migration globale dans les liquides
simulateurs aqueux en cellule

Werkstoffe und Gegenstände in Kontakt mit Lebensmitteln
- Kunststoffe - Teil 5: Prüfverfahren für die
Gesamtmigration in wässrigen Prüflebensmitteln mittels
Zellen

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.



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Foreword

This document EN 1186-5:2002 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 1186-5:1994.

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 1186-5 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 4	Test methods for overall migration into olive oil 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

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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

Annex A is 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.

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1 Scope

This Part of this European Standard specifies test methods for the determination of the overall migration into aqueous based food simulants from one surface only of plastics, which are intended to come into contact with foodstuffs, by exposing the food contact surface, using a cell, to the selected food simulant at temperatures up to and including 70 °C for selected test 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 of surfaces that differ in their migration characteristics, which should be tested with the food simulant in contact only with the surface which is intended to come into contact with foodstuffs.

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.*
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3 Principle

The overall migration of non-volatile substances from a sample of the plastics is determined as the mass of non-volatile residue after evaporation of the food simulant.

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

Test specimens of approximately 2,5 dm² are exposed in a cell to the food simulant for the exposure time at temperatures up to and including 70 °C. At the end of the test period, each test specimen is removed from the cell. The food simulant from each test specimen is evaporated to dryness, the mass of the non-volatile residue is determined gravimetrically and expressed as milligrams per square decimetre of surface area of test specimen.

NOTE In some circumstances the procedure described in this standard can be used for exposure at temperatures above 70 °C.

Overall migration is reported as the mean of three determinations on separate test specimens.

4 Reagents

NOTE For details of the preparation and purity of these reagents see clause 4 of EN 1186-1:2002.

4.1 Distilled water or water of equivalent quality (simulant A)

4.2 Acetic acid 3 % (w/v) in aqueous solution (simulant B)

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4.3 Ethanol 10 % (v/v) in aqueous solution (simulant C)

4.4 Alcoholic simulants for liquids or beverages of an alcoholic strength exceeding 10 % (v/v).

NOTE In the case of materials and articles intended to come into contact with liquids or beverages of an alcoholic strength exceeding 10 % (v/v) the test is carried out with aqueous solutions of ethanol of a similar strength.

5 Apparatus

5.1 Cutting slab, clean smooth glass, metal or plastics slab of suitable area to prepare test specimens, 250 mm × 250 mm is suitable.

5.2 Tweezers, stainless steel, blunt nosed.

5.3 Cutting implement, scalpel, scissors or sharp knife or other suitable device.

5.4 Rule, graduated in millimetres, and with an accuracy of 0,1 mm.

5.5 Analytical balance capable of determining a change in mass of 0,1 mg.

5.6 Cells, type A as shown in Figure C.3 of EN 1186-1:2002, either the all aluminium (anodized) cells or the cells with the stainless steel (316 grade) lids and rings, are suitable for the water and aqueous ethanol food simulants. For the aqueous acetic acid food simulant the cells with the stainless steel lids and rings are used. The internal diameter of the rim of the sealing ring shall be 178,4 mm ± 0,1 mm, to give an area of the test specimen exposed to the food simulant of 2,5 dm².

NOTE The cells, type A, are constructed with a rubber mat in the base plate. When using the cells with either the water or aqueous ethanol food simulants it is advised that a disc of aluminium foil is placed on the mat before inserting the test specimen. For the aqueous acetic acid food simulant a disc of polytetrafluoroethylene or other suitable material which is inert to acetic acid can be used. The use of these discs will prevent any substances from the mat influencing the migration result.

For details of equivalent cells see 7.3 of EN 1186-1:2002.

5.7 Pipettes, complying with the minimum requirements of ISO 648, 50 ml and 100 ml.

5.8 Glass tubes, ground neck, and stoppers, for retaining the food simulant. Tubes with an internal diameter of approximately 35 mm and length of approximately 100 mm to 200 mm, excluding the ground neck (see 7.2 of EN 1186-1:2002), have been found to be satisfactory.

5.9 Thermostatically controlled oven or incubator or refrigerator capable of maintaining a set temperature within the tolerances specified in Table B.2 of EN 1186-1:2002.

5.10 Dishes, stainless steel, nickel, platinum, platinum alloy, gold, 50 mm to 90 mm diameter and maximum mass 100 g, for evaporation of food simulants and weighing of residues. Glass, glass ceramic or ceramic dishes may be used, provided that the surface characteristics are such that the masses of the dishes after evaporation of any specified food simulants followed by conditioning in the desiccator used achieves a constancy of ± 0,5 mg. Stainless steel and nickel dishes are suitable only for distilled water and ethanol solutions. Glass, glass ceramic, glazed ceramic, platinum, platinum alloy or gold dishes are suitable for all three simulants.

5.11 Steam bath, hot plate, distillation apparatus or rotary evaporator for evaporation of food simulant at the end of test period.

5.12 Desiccator with anhydrous calcium chloride or self indicating silica gel.

5.13 Measuring cylinders, 250 ml, complying with the minimum requirements of ISO 4788.

6 Preparation of test specimens

6.1 General

It is essential that test specimens are clean and free from surface contamination (many plastics can readily attract dust due to static charges). Before preparing test specimens, remove any surface contamination from the sample by gently wiping it with a lint free cloth, or by brushing with a soft brush. Under no circumstances wash the sample with water or solvent. If it is specified in the instructions for use of the article that it should be washed or cleaned before use, see 8.1 of EN 1186-1:2002. Minimize handling of the samples and where necessary, wear cotton gloves.

7 Number of test specimens

Three test specimens are required for samples, in the form of thin films, sheets, and flat sections cut from containers or similar articles.

7.1 Cutting test specimens

Lay the sample on the cutting slab (5.1) with the surface to be in contact with the food simulant uppermost. Take the ring from the standard cell (5.6) and place on the surface of the sample. Cut out the test specimen by cutting round the outer edge of the ring, using the cutting implement (5.3).

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8 Procedure

8.1 Exposure to food simulant

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Take three cells (5.6), mark these for identification purposes. Place in the thermostatically controlled oven or incubator or refrigerator (5.9), which is set at the selected test temperature and leave until the test temperature has been attained.

Take three glass tubes (5.8), for the simulant for contact with the test specimens and a further two to provide blanks, measure by measuring cylinder 125 ml \pm 2 ml of the food simulant into each tube. Insert a thermometer or thermocouple, if applicable, see NOTE 2, in one of the tubes and stopper the tubes.

Mark the liquid level on the outside of each tube with a suitable marker.

Place the five tubes in the thermostatically controlled oven or incubator or refrigerator, set at the test temperature and leave until the simulant has attained the test temperature.

Remove the cells from the thermostatically controlled oven or incubator or refrigerator, dismantle and place on the base of each cell one of the test specimens. Reassemble the cells, ensuring that the clamping screw wheel is well tightened down.

Remove three tubes containing 125 ml of the food simulant from the thermostatically controlled oven or incubator or refrigerator and transfer the food simulant from each tube to each of the cells through the filler hole. Remove the thermometer or thermocouple from the tube and insert, if applicable see NOTE 2, in one of the cells and replace the filler plugs. This part of the operation should be carried out in the minimum time to prevent undue heat loss from the cells and simulants.

Replace the test cells in the thermostatically controlled oven or incubator or refrigerator, set at the test temperature. Observe the temperature, leave the cells and the blank tubes for the selected period of time after the temperature of the simulant in the cell has reached a temperature within the permitted tolerance for the test temperature, see Tables B.1 and B.2 of EN 1186-1:2002 for permitted tolerances on test times and temperature.