



SLOVENSKI STANDARD

SIST EN 12873-2:2005

01-maj-2005

Vpliv materiala na pitno vodo - Vpliv migracije – 2. del: Metoda preskušanja nekovinskih in necementnih materialov

Influence of materials on water intended for human consumption - Influence due to migration - Part 2: Test method for non-metallic and non-cementitious site-applied materials

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Einfluss von Materialien auf Trinkwasser - Einfluss infolge der Migration - Teil 2: Prüfverfahren für vor Ort aufgebrachte nicht metallische und nicht zementgebundene Materialien

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Influence sur l'eau des matériaux destinés à entrer en contact avec l'eau destinée à la consommation humaine - Influence de la migration - Partie 2 : Méthode d'essai des matériaux appliqués sur site excepté les matériaux métalliques et ceux à base de ciment

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ICS:

13.060.20	Pitna voda	Drinking water
67.250	Materiali in predmeti v stiku z živili	Materials and articles in contact with foodstuffs

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EUROPEAN STANDARD
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EN 12873-2

February 2005

ICS 13.060.20; 67.250

English version

**Influence of materials on water intended for human consumption
- Influence due to migration - Part 2: Test method for non-
metallic and non-cementitious site-applied materials**

Influence sur l'eau des matériaux destinés à entrer en
contact avec l'eau destinée à la consommation humaine -
Influence de la migration - Partie 2 : Méthode d'essai des
matériaux appliqués sur site excepté les matériaux
métalliques et ceux à base de ciment

Einfluss von Materialien auf Trinkwasser - Einfluss infolge
der Migration - Teil 2: Prüfverfahren für vor Ort
aufgebrachte nicht metallische und nicht zementgebundene
Materialien

This European Standard was approved by CEN on 3 January 2005.

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.

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 Central Secretariat has the same status as the official versions.

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Foreword

This document (EN 12873-2:2005) has been prepared by Technical Committee CEN/TC 164 "Water supply", the secretariat of which is held by AFNOR.

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 August 2005, and conflicting national standards shall be withdrawn at the latest by August 2005.

It has been drawn up with the objective to describe a test method to determine the migration of substances from non-metallic and non-cementitious materials for use in contact with water intended for human consumption.

This document will result in one of a series of standards on test methods which support the appropriate standards.

This document, part 2, is the second in a series of standards for dealing with the influence of migration from materials on water intended for human consumption, including:

- Part 1: Test method for non-metallic and non-cementitious factory made products;
- Part 2: Test method for non-metallic and non-cementitious site-applied materials;
- Part 3: Test method for ion exchange and absorbent resins;
- Part 4: Test method for water treatment membranes.

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According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

In respect of potential adverse effects on the quality of water intended for human consumption caused by the materials, it is called to mind that, while awaiting the adoption of verifiable European acceptance criteria, the relevant national regulations remain in force.

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1 Scope

This document specifies a procedure to determine the migration of substances from non-metallic and non-cementitious site-applied materials for use in contact with water intended for human consumption.

It is applicable to site-applied materials intended to be used under various conditions for the transport and storage of water intended for human consumption, including raw water used for the production of water intended for human consumption. It covers the extraction by water of substances from these materials after their application on site.

The document is applicable to materials whose physical or chemical properties alter during or after on-site application, such as coatings, paints, and adhesives. In addition, some site-applied materials that do not change in such a manner, e.g. greases or lubricants, are also included.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN ISO 7393-2, *Water quality — Determination of free chlorine and total chlorine — Part 2: Colorimetric method using N, N-diethyl-1,4-phenylenediamine, for routine control purposes*. (ISO 7393-2:1985)

3 Terms and definitions

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

3.1

test

technical operation that consists of the determination of one or more characteristics of a given product

3.2

test procedure

specified technical method for performing a test

3.3

test report

document that presents test results and other information relevant to a test

3.4

testing laboratory

laboratory that performs tests

3.5

material

manufactured items(s) for application on-site and subsequent contact with water intended for human consumption

3.6

product

material, in its finished form after application on site, that comes into contact with water intended for human consumption

3.7**test piece**

product to be tested for suitability for use in contact with water intended for human consumption

3.8**tap water**

water intended for human consumption (5.2.1)

3.9**test water**

water used for migration testing (5.2.2 and 5.2.3)

3.10**disinfection treatment water**

water used for preliminary chlorination (5.2.4)

3.11**prewashing water**

water used for prewashing (5.2.5)

3.12**blank water**

test water, (5.2.2 and 5.2.3) which has been kept at the same specified conditions as migration water (3.15) but without contact with test pieces

3.13**migration**

movement of a substance or substances from test pieces into test water

3.14**migration period**

period of time in which the migration is carried out under specified conditions

3.15**migration water**

test water after exposure to a test piece under specified conditions

3.16**migration rate**

mass of a measured substance or substances (in mg) migrating from one square decimetre of a test piece into the test water in one day at a specified temperature (°C)

3.17**fitting, ancillary**

complete functional unit made up of one or more components or materials, parts of which are in contact with water intended for human consumption, e.g. taps, valves, water meters, water filters, pipe connectors and flexible hose assemblies

3.18**lining**

layer of material applied on site and intended, as a finished product, to come into contact with drinking water, e.g. the inside surfaces of pipes, fittings or storage vessels

3.19**cure**

conversion of a material into its final form; for example by chemical reaction or drying

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4 Principle

Test pieces are taken on site or prepared under specific conditions that are intended to simulate site-application taking into account the manufacturer's written instructions.

Each test piece is subjected to a specified pretreatment procedure of stagnation and prewashing. The surface of the test piece, that is exposed in practice to water intended for human consumption, is brought into contact with test water during at least three sequential migration periods. A migration period is either;

- 72 h at 23 °C for products intended to come into contact with cold water.
- 24 h at a specified temperature in the range 60 °C to 85 °C for products intended to come into contact with warm or hot water.

Migration rates for the first three migration periods are determined by analysis of the required substances in the corresponding migration waters.

NOTE 1 The test is carried out under conditions to ensure that calculation of a reliable migration rate is facilitated. These conditions are not meant to simulate any service condition. Relating the results obtained from this document to the service condition is carried out using a conversion procedure. This procedure will be specified in regulations.

NOTE 2 The choice of the type of test water (chlorinated and/or chlorine free), the temperature of the test water, the number of additional migration periods and the necessity for a preliminary chlorination (see Clause 8) will be specified by product/system standards or regulations.

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5 Reagents

5.1 General

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For the purpose of this document, the following reagents apply.

5.2 Waters to be used for testing

5.2.1 tap water, water intended for human consumption with a free chlorine content less than 0,2 mg/l as Cl₂.

5.2.2 test water, chlorine-free water with a conductivity of < 2 mS/m and a total organic content (TOC) of < 0,2 mg/l C, e.g. prepared by reverse osmosis, deionization or distillation, followed by activated carbon filtration.

5.2.3 chlorinated test water, test water according to 5.2.2 having an active chlorine content of (1 ± 0,2) mg/l as Cl₂ (5.3).

5.2.4 disinfection treatment water, test water according to 5.2.2 having an active chlorine content of (50 ± 5) mg/l as Cl₂ (5.4).

5.2.5 prewashing water, tap water (5.2.1).

5.3 Cleaning liquids for glassware

5.3.1 hydrochloric acid, concentrated (30 % mass per volume) analytical reagent grade.

5.3.2 hydrochloric acid solution, prepared by slowly adding (0,5 ± 0,01) l of concentrated hydrochloric acid (5.3.1) to (0,5 ± 0,01) l of test water (5.2.2).

NOTE Care is needed because the solution may generate heat.

5.3.3 nitric acid, concentrated (65 % mass per volume) analytical reagent grade.

5.3.4 nitric acid solution, prepared by slowly adding $(0,5 \pm 0,01)$ l of concentrated nitric acid (5.3.3) to $(0,5 \pm 0,01)$ l of test water (5.2.2).

NOTE Care is needed because the solution may generate heat.

5.3.5 sulphuric acid, concentrated (density 1,84 g/ml) analytical reagent grade.

5.3.6 chromic acid, analytical reagent grade prepared by dissolving (50 ± 1) g of chromium (VI) oxide in $(1 \pm 0,02)$ l of sulphuric acid (5.3.5).

NOTE Chromic acid is a storage hazard; it may burst a sealed container due to carbon dioxide release. It is a powerful oxidant and may give potentially explosive reactions with oxidizable materials. It may ignite on contact with acetone or alcohols. When heated to decomposition it emits acrid smoke and irritating fumes.

5.4 Other reagents

sodium hypochlorite, prepared from a technical or general purpose reagent grade of sodium hypochlorite (NaOCl), using test water (5.2.2) and having a known concentration of about 0,1 % mass fraction of free chlorine determined in accordance with EN ISO 7393-2.

NOTE Unless tests have proved otherwise the sodium hypochlorite solution should be considered unstable and prepared on the day of use.

6 Apparatus

6.1 Vessels, containers, stoppers and connections, consisting of a material, such as glass, PTFE or stainless steel, which is inert under the specified test conditions (Clause 9).

NOTE The material PTFE should only be used when there is a small contact area with the test water. Thus PTFE is unsuitable for containers

6.2 Plates, stainless steel, mild steel, (sand blasted) glass or concrete/cement mortar plates, for testing the material. The plates must be covered completely with the test material.

6.3 Equipment, capable of maintaining the appropriate migration temperature, e.g. (23 ± 2) °C, or (60 ± 2) °C, to (85 ± 2) °C.

6.4 Cleaning, of laboratory glassware, stainless steel plates and sand blasted glass plates shall be cleaned by washing with a biodegradable laboratory detergent, followed by rinsing with either hydrochloric acid solution (5.3.2) (except for stainless steel), nitric acid solution (5.3.4) or chromic acid (5.3.6) and finally by thoroughly rinsing with test water (5.2.2). Drain the plates and dry them in a hot air cabinet.

7 Test pieces

7.1 General requirements

The manufacturer shall provide a copy of the detailed instructions for application that accompany the materials(s).

The application instructions shall cover aspects such as:

- a) surface preparation;

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- b) mix ratios and method of mixing;
- c) method of application;
- d) minimum curing temperature and time;
- e) product film thickness;
- f) associated materials, e.g. primers and undercoats.

The manufacturer shall provide all necessary information on material and chemical safety.

Test pieces shall be prepared on site by the manufacturer/contractor under the supervision of the test laboratory in accordance with the manufacturer's written instructions. If no specialised equipment for application is required then the test pieces may be prepared by the test laboratory under conditions that simulate site application. Where it is found necessary to deviate from these instructions, this shall only be done with the prior agreement of the test laboratory and manufacturer or contractor.

If transportation of test pieces to the test laboratory is necessary, then this period of time shall be part of the curing conditions (e.g. time and temperature).

The test pieces shall be delivered within the curing period.

The test laboratory shall prepare a detailed record of test piece preparation and curing conditions.

Care shall be taken to ensure that materials and test pieces are not contaminated during transport.

7.2 Requirements for the preparation of test piece

7.2.1 Site-applied organic lining systems for pipes

7.2.1.1 Prepare test pieces in accordance with the requirements in 7.1.

NOTE It is recommended to line pipes of the smallest diameter and maximum recommended length in order to meet the requirements in 7.3.

7.2.1.2 Cut test pieces of identical length from the lined pipe.

7.2.1.3 Pretreat the test pieces according to Clause 8.

7.2.1.4 Pipes with DN > 80 shall be tested in accordance with Annex B to meet the requirements in 7.3.

7.2.2 Jointing compounds (solvent cements, adhesives)

7.2.2.1 Join eleven lengths of pipe with ten double sockets using the cement/adhesive in accordance with both the pipe/fittings and the cement/adhesive manufacturer's instructions or relevant product/system standards to give a test piece of 1 m. Where this cannot be done, use as many joints as possible in 1 m.

7.2.2.2 Cure the test pieces in accordance with the manufacturer's instructions.

7.2.2.3 Pretreat the test piece according to Clause 8.

NOTE 1 It is recommended that this test should be undertaken using the smallest diameter pipe and double-sockets in order to meet the requirements in 7.3.

NOTE 2 The pipe and double sockets to be used may be specified by either the manufacturer or in relevant product/system standards or regulations.