



SLOVENSKI STANDARD
oSIST prEN 12873-3:2017

01-oktober-2017

Vpliv materiala na pitno vodo - Vpliv migracije - 3. del: Preskusna metoda za ionsko izmenjavo in vpojne smole

Influence of materials on water intended for human consumption - Influence due to migration - Part 3: Test method for ion exchange and adsorbent resins

Einfluss von Materialien auf Wasser für den menschlichen Gebrauch - Einfluss infolge der Migration - Teil 3: Prüfverfahren für Ionenaustauscher und Adsorberharze

Influence des matériaux en contact sur l'eau destinée à la consommation humaine - Influence due à la migration - Partie 3 : Méthode d'essai des résines adsorbantes et échangeuses d'ions

Ta slovenski standard je istoveten z: prEN 12873-3

ICS:

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

oSIST prEN 12873-3:2017

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 12873-3

August 2017

ICS 13.060.20; 67.250

Will supersede EN 12873-3:2006

English Version

Influence of materials on water intended for human consumption - Influence due to migration - Part 3: Test method for ion exchange and adsorbent resins

Influence des matériaux en contact sur l'eau destinée à la consommation humaine - Influence due à la migration - Partie 3 : Méthode d'essai des résines adsorbantes et échangeuses d'ions

Einfluss von Materialien auf Wasser für den menschlichen Gebrauch - Einfluss infolge der Migration - Teil 3: Prüfverfahren für Ionenaustauscher und Adsorberharze

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 164.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 12873-3:2017) has been prepared by Technical Committee CEN/TC 164 “Water supply”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12873-3:2006.

This draft will result in one of a series of standards on test methods which support the appropriate standards, for products in contact with water intended for human consumption.

It has been drawn up with the objective to describe a test method to determine the migration of substances from ion exchange and absorbent resins.

Evaluation of the efficiency of resins, in removing contaminants, is not included.

Annex A, provides a flow diagram of the steps in the test procedure.

Annex B, describes a test apparatus.

Annex C, provides information on resin pre-treatment.

This draft standard is the third in a series of standards 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 adsorbent resins;

Part 4 Test method for water treatment membranes.

The major technical changes from EN 12873-3:2006 are:

- Introduction of a second sampling method
- Specification of a method of control of the test device

prEN 12873-3:2017 (E)

Introduction

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

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12873-3:2019

<https://standards.iteh.ai/catalog/standards/sist/0ea8c461-88a0-4c70-8185-4a031911314d/sist-en-12873-3-2019>

1 Scope

This European Standard specifies a procedure to determine the migration of substances from ion exchange, adsorbent or hybrid resin materials for use in contact with water intended for human consumption.

Resins comprise synthetic organic macromolecular materials.

This standard is applicable to resins of the following types:

- ion exchange resins: used to modify the composition of water (e.g. softening by removal of calcium ions). They can be in either an anionic or cationic state;
- adsorbent resins: used to lower the concentration of undesirable substances (usually organic pollutants) from water. They are used in a neutral state;
- hybrid adsorbers: Organic polymer based ion exchange resin or adsorbent resin with incorporated inorganic (e.g. iron hydroxide) or second organic phase. Used to lower the concentration of undesirable substances (specific inorganic or organic pollutants) from water. They can be in either an anionic, cationic or neutral state.

2 Terms and definitions

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

2.1

test

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

2.2

test procedure

specified technical method for performing a test

2.3

test report

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

2.4

testing laboratory

laboratory that performs tests

2.5

product

material, in its finished form that comes into contact with water

2.6

test sample

sample of a product submitted for testing

2.7

test water

water for migration testing (4.1)

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2.8

blank water

test water (4.1) which has been kept at the same specified conditions as migration water (see Clause 8) but without contact with the test sample

2.9

migration

movement of a substance or substances from a test sample into the test water

2.10

bed volume (BV)

volume in litres of wet resin, tapped to a constant volume, used in the test

2.11

regeneration

part of the operating cycle of an ion-exchange resin process in which a specific chemical solution is passed through the resin bed to prepare it for a service run

2.12

exhaustion

process in which a specific chemical solution is passed through the regenerated ion exchange resin bed to exchange the ions in this solution for an equivalent amount of ions from the resin bed to simulate an accelerated service run

2.13

cycling

combination of exhaustion and regeneration

2.14

rinse

washing process with specified medium

2.15

disinfection

procedure, normally using chemicals, such as sodium hypochlorite or peracetic acid, carried out on a resin to inactivate microorganisms

3 Principle

If relevant, at the beginning of the test, the test sample is subjected to pre-treatment procedures according to the manufacturer's instructions.

The test sample is brought into contact with test water during a static/dynamic procedure carried out at (23 ± 2) °C.

Test water samples are collected for analysis after contact with the resin.

4 Reagents

4.1 General

Only reagents of analytical grade shall be used, except where specified otherwise. All reagents shall be of sufficient purity to ensure that they do not give rise to interferences during the analysis of the extracts.

NOTE Contamination can arise from various sources, e.g. plastics or rubber materials. The use of procedural blanks and laboratory blanks assists in detecting any contamination and identifying its source.

The test water shall be chlorine free water with a conductivity of $< 1 \mu\text{S}/\text{cm}$ at $25 \text{ }^\circ\text{C}$ and a total organic content (TOC) of $< 0,2 \text{ mg/l C}$, e.g. prepared by reverse osmosis, deionization or distillation, followed by activated carbon filtration.

4.2 Cleaning liquids for glassware

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

4.2.2 hydrochloric acid solution, prepared by slowly adding $(0,5 \pm 0,01) \text{ l}$ of concentrated hydrochloric acid (4.2.1) to $(0,5 \pm 0,01) \text{ l}$ of test water (4.1).

NOTE Care is needed because the solution may generate heat.

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

4.2.4 nitric acid solution, prepared by slowly adding $(0,5 \pm 0,01) \text{ l}$ of concentrated nitric acid (4.2.3) to $(0,5 \pm 0,01) \text{ l}$ of test water (4.1).

NOTE Care is needed because the solution may generate heat.

5 Apparatus

5.1 Vessels, containers, stoppers and connections, consisting of a material, such as glass, PTFE or stainless steel, that is inert under the specified test conditions (see Clause 8).

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

It is recommended to have dedicated equipment.

NOTE Do not use glass stoppers with grease.

5.2 Test apparatus. Specifications see Annex B. For any column used, the ratio of bed height (h) to bed diameter (d) shall be $5 \pm 0,3$ ($h/d = 5 \pm 0,3$).

5.3 Temperature control facility, such as a temperature-controlled laboratory, capable of maintaining the test apparatus at $(23 \pm 2) \text{ }^\circ\text{C}$.

5.4 Laboratory glassware, cleaned by washing with a biodegradable laboratory detergent, followed by rinsing with either hydrochloric acid solution (4.2.2) or nitric acid solution (4.2.4) and finally by thoroughly rinsing with test water (4.1).

5.5 Control of the test device

For new test device, replacement of parts, longer standby periods, and after previous tests with high TOC release or any other potential contamination the test device should be controlled.

For this purpose rinse the test device with test water at 5 BV/h until the TOC concentration at the column outlet is lower than $0,5 \text{ mg/l}$. If impossible to reach a level lower than $0,5 \text{ mg/l}$, check the entire test device for any source of contamination.

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6 Test samples

A representative sample of the resin shall be taken and treated according to manufacturer's instructions.

7 Pre-treatment of test samples

Rinsing or cycling (exhaustion/regeneration) of wet resins, if relevant, shall be carried out according to manufacturer's instructions (see Annex C).

Do not carry out any regeneration or cycling procedure in the test apparatus.

8 Test procedure

8.1 General

This test procedure comprises two different sampling modes: sampling mode A and sampling mode B. Unless specified differently by national regulations sampling mode B is used.

NOTE 1 The actual number of leachate samples to be taken, their analysis and assessment will be specified in national or other regulations.

NOTE 2 Whether single or multiple testing is to be carried out on a product will be specified in national or other regulations. The method assumes single testing.

8.2 Preparation of leachate sample

8.2.1 After any pre-treatment if relevant measure the volume of tapped test resin (see 8.2.4 or 8.2.5) and add it slowly to the glass column. Ensure that the test water level does not fall below the level of the resin bed and that there are no air bubbles in the bed.

The resins should be added to the column as a slurry in test water in order to overcome problems of wetting and air entrainment.

Connect the column to the test water vessel (see Annex B) and feed with 20 ($\pm 0,5$) bed volumes of test water at a rate of 10 ($\pm 0,25$) bed volumes per hour.

8.2.2 Leave to stand for 24 h in the absence of light with the test water level at least 30 mm above the top of the bed of resin to prevent air getting into the resin bed.

8.2.3 Start the flow of test water through the column at a rate of ($5 \pm 0,25$) bed volumes per hour. Continue with 8.2.4 (sampling mode A) or 8.2.5 (sampling mode B).

8.2.4 Sampling mode A

NOTE Typically volume of test resin is 100 ml (see Annex B).

8.2.4.1 Collect the first 5 bed volumes individually (water samples A₁, A₂, A₃, A₄, A₅). Analyse the samples according 8.4 and calculate the test results according 9.1.

8.2.5 Sampling mode B

NOTE Typically volume of test resin is 500 ml (see Annex B).

8.2.5.1 Collect the first 3 bed volumes (water samples A₁, A₂, A₃) and combine into water sample T_A.