SLOVENSKI STANDARD
SIST EN 852-1:1997

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Cevni sistemi iz polimernih materialov za transport pitne vode - Vrednotenje migracije - 1. del: Določanje migracijskih vrednosti cevi iz plastomernih materialov

Plastics piping systems for the transport of water intended for human consumption - Migration assessment - Part 1: Determination of migration values of plastics pipes

Kunststoff-Rohrleitungssysteme für den Transport von Wasser für den menschlichen Verzehr - Bewertung der Migration - Teil 1: Bestimmung der Migrationswerte von Kunststoffrohren

Systemes de canalisations plastiques pour le transport d'eau destinée a la consommation humaine - Evaluation de la migration - Partie 1: Détermination des valeurs de migration des tubes plastiques

Ta slovenski standard je istoveten z: **EN 852-1:1996**

ICS:

13.060.20	Pitna voda	Drinking water
23.040.20	Cevi iz polimernih materialov	Plastics pipes

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English version

Plastics piping systems for the transport of water intended for human consumption - Migration assessment - Part 1: Determination of migration values of plastics pipes

Systèmes de canalisations plastiques pour le transport d'eau destinée à la consommation humaine - Evaluation de la migration - Partie 1: Détermination des valeurs de migration des tubes plastiques

Kunststoff-Rohrleitungssysteme für den Transport von Wasser für den menschlichen Verzehr - Bewertung der Migration - Teil 1: Bestimmung der Migrationswerte von Kunststoff Rohren

This European Standard was approved by CEN on 1996-01-27. 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.

The European Standards exist 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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CEN

European Committee for Standardization
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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NNI, and consists of two parts:

Part 1: Determination of migration values of plastics pipes;

Part 2: Determination of the number of migrations and conversion of laboratory values.

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 November 1996, and conflicting national standards shall be withdrawn at the latest by November 1996.

It is based on ISO 8795:1990 "Plastics pipes for the transport of water intended for human consumption - Extractibility of constituents - Test method", published by the International Organisation for Standardisation (ISO). It differs from ISO 8795:1990 due to the need for the test method to be applicable to European conditions and practice.

The main modifications are:

a) test liquids:

- pH 11, which is not a European condition, is deleted;
- pH 7 has been changed to pH 9, to cover European conditions (see Directive 80/778/EEC Appendix 1.B);
- addition of test liquid with an active chlorine content of 1 mg/l;

b) a stagnation period has been added;

c) exposure time: 72 h is specified;

d) temperatures:

- 27 °C is deleted (tropical condition not relevant to Europe);
- 70 °C is specified for moderate hot water conditions;

e) large diameter pipes: a test arrangement for large diameter pipes has been added.

Annex A, which is normative, describes the preparation of test liquids.

Annex B, which is normative, describes additional procedures for testing pipes with nominal sizes in excess of 80.

Annex C, which is informative, gives a bibliography.

When a standard on this subject covering the requirements in the referring standard is issued by CEN/TC 164, this CEN/TC 155 standard will be withdrawn.

This standard is one of a series of standards on test methods which support System Standards for plastics piping systems and ducting systems.

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

1 Scope

This Standard specifies a method for the determination of the migration of constituents from the internal surface of plastics pipes. Organoleptic and microbiological assessments are not included.

This standard is applicable to all plastics pipes to be used for the transport of water intended for human consumption and raw water used for the manufacturing of water intended for human consumption. It covers all constituents which are extractable by water from a finished pipe. It provides for a change in procedure as necessary depending upon the size of the pipe.

For each application and each material, the relevant test conditions need to be stated in the System Standard concerned.

2 Normative references

This standard incorporates by dated or 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, or revisions of, any of these publications apply to this standard only when incorporated in it by amendment or revision.
For undated references the latest edition of the publication referred to applies.

EN 1420-1	*Influence of materials on water intended for human consumption - Organic materials - Pipes, fittings and their coatings used in piping systems - Odour and flavour assessment of water - Part 1: Test method*
ISO 3696:1987	*Water for analytical laboratory use - Specification and test methods*
ISO 7393-2:1985	*Waterquality - Determination of free chlorine and total chlorine - Part 2: Colorimetric method using N,N-diethyl-1,4-phenylenediamine, for routine control purposes*

3 Definitions

For the purposes of this Standard the following definitions apply:

3.1 migration: Movement of substances from one material (plastics pipe) into another (test liquid).

3.2 test liquid: A specified water for migration testing.

3.3 migration value (*M*): The mass of constituent(s) migrated from a specified inner surface area of a pipe test piece exposed to a test liquid at a specified temperature over a specified time.

3.4 tapwater: Water intended for human consumption.

4 Principle

Test pieces are subjected to stagnation and prewashing with tapwater for a specified time. The test pieces are then filled with the specified test liquid at a specified temperature and kept for a series of specified migration periods. The test liquid is then analyzed to assess any constituents which were able to migrate.

NOTE: It is assumed that the following test parameters are set by the standard making reference to this standard:

a) the test liquid(s) (see 5.2);

b) the test temperature, T, if other than as given in clause 6;

c) the number of pairs of test pieces (see 8.3);

d) the constituents for which analysis is to be made both upon test pieces and the blank test and the required accuracy, taking account of 9.5 (see also clause 10).

5 Reagents

5.1 Water, conforming to grade 3 of ISO 3696:1987, with the following characteristics:

a) a conductivity of ≤ 10 mS/m at 25 °C;

b) total organic carbon (TOC) content ≤ 0,2 mg/l (as carbon);

c) negligible concentrations of any measurable substances that could interfere with measurements to determine a) and b).

5.2 Test liquids

NOTE: Methods for the preparation of test liquids are given in annex A.

5.2.1 Water, conforming to 5.1.

5.2.2 Chlorinated water, conforming to 5.1 with an active chlorine concentration of (1 ± 0,2) mg/l.

5.2.3 Acidic water, comprising water conforming to 5.1, adjusted to a pH of (4,5 ± 0,1) with a KH_2PO_4 buffer solution conforming to A.1.2.

5.2.4 Chlorinated acidic water, comprising water conforming to 5.1, adjusted to a pH of (4,5 ± 0,1) with a KH_2PO_4 buffer solution conforming to A.1.2 and an active chlorine concentration of (1 ± 0,2) mg/l.

5.2.5 Alkaline water, comprising water conforming to 5.1, adjusted to a pH of (9,0 ± 0,1) with a boric acid buffer solution conforming to A.1.3.

5.3 Selection of test liquids

5.3.1 For cold water applications the test liquids shall conform to 5.2.1 to 5.2.5 inclusive.

5.3.2 For warm and hot water applications (see clause 6) the test liquid shall conform to 5.2.1.

6 Test temperatures

Unless otherwise specified in the referring standard, the test temperature shall be selected as follows:

a) for cold water applications the test temperature is (23 ± 2) °C;

b) for warm water applications the test temperature is either (60 ± 2) °C or (70 ± 2) °C, depending upon the class of pipe;

c) for hot water applications the test temperature is (90 ± 2) °C.

7 Apparatus

7.1 Connections, stoppers and containers, made of material which is inert at the specified test conditions, such as glass or PTFE or stainless steel (see also annex B).

NOTE: The material PTFE should only be used when there is a small contact area with the test liquid, thus not for containers.

7.2 Thermostatically controlled environment or enclosure, capable of maintaining the relevant test temperature(s) (see clause 6).

8 Test pieces

8.1 General

The test pieces shall have an age of at least 14 days after manufacturing of the pipe.

8.2 Preparation

For each test, take two test pieces from a pipe, each of sufficient length and surface to give the volume of the test liquid necessary to determine, with the required accuracy, the amount of any migrated consituent(s).

The value of S/V shall not be less than 5 (dm^{-1}), where:

S is the inner surface area of test piece, in square decimetres, exposed to the test liquid;

V is the volume of test liquid, in litres;

except as follows for pipes with nominal sizes in excess of 80, where the S/V value of 5 cannot be conformed to, then the test arrangement shall be adjusted to one of the methods as given in annex B.

NOTE: The value of S/V is dependent on the analytical requirements for each specific constituent of interest, particularly the minimum concentration to be determined [see d) of the note to clause 4]. The lowest value for S/V is then determinant.

8.3 Number

The number of pairs of test pieces shall be as specified in the referring standard.

9 Procedure

9.1 General

9.1.1 Carry out the procedures given in 9.2 to 9.5 in duplicate at the same time.

Complete the sequence consisting of stagnation (9.2), prewashing (9.3) and finally migration (9.4) within 10 days (see 9.1.2).

9.1.2 Carry out a blank test in parallel with 9.1.1, using the same test conditions (test liquid, test temperature, migration time and stoppers) in a container of sufficient volume conforming to 7.1, but made of glass. Determine at the end of each migration period (see 9.4) the concentration, C_0, of each specified constituent [see d) of the note to clause 4] and associated interfering substances with the required accuracy.

NOTE: If a bulk supply of test liquid is used for the duplicate test then one blank test is sufficient.

9.2 Stagnation time

9.2.1 Pipes to be tested at 23 °C

9.2.1.1 Close one end of each test piece, using a stopper (see 7.1).

9.2.1.2 Fill the test piece with tapwater and let it stand for (24 ± 0,5) h at the test temperature (see clause 6).

9.2.1.3 After this period remove the water and stopper. Prewash the test piece in accordance with 9.3.

9.2.2 Pipes to be tested at elevated temperatures

9.2.2.1 Close one end of each test piece using a stopper (see 7.1).

9.2.2.2 Fill the test piece with tapwater at the test temperature (see clause 6) and let it stand for (7,5 ± 0,5) h at the test temperature.

9.2.2.3 After this period, remove the water and refill the test piece with fresh tapwater which has been brought to the test temperature and let it stand for (16 ± 0,5) h at the test temperature.

9.2.2.4 After this period, remove the water and stopper. Prewash the test piece in accordance with 9.3.

9.3 Prewashing

9.3.1 Connect the test piece to a source of tapwater via a suitable connector (see 7.1) such that the test surface is totally covered during prewashing.

9.3.2 Let the tapwater flow through the test piece with a velocity between 2 m/min and 4 m/min.

9.3.3 Maintain the water flow for a period between 60 min and 70 min.

9.3.4 Stop the water flow and rinse out the test piece using water conforming to 5.1.

9.4 Migration test

9.4.1 Close one end of each test piece, which has been subjected to the prewashing, using a stopper (see 7.1).

9.4.2 Fill the test piece with the specified test liquid (see clause 4 and 5.2). Close the other end of each test piece using a stopper (see 7.1) and maintain the filled test piece at the specified temperature for (72 ± 1) h.

9.4.3 For the first migration, at the end of the first test period remove the stopper, empty the test liquid from the test piece into a suitable container. Determine to the specified accuracy the amount of each specified constituent present, C_1 (see 9.5 and clause 10).

9.4.4 For any subsequent migration n repeat the steps 9.4.2 and 9.4.3 to determine C_n where n corresponds to the number of times those steps have been carried out (the migration number).

NOTE: The total number of migrations should conform to the requirements of EN 852-2.