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Cevni sistemi iz polimernih materialov za transport pitne vode - Vrednotenje migracije - Navodilo za razlago laboratorijsko pridobljenih migracijskih vrednosti

Plastics piping systems for the transport of water intended for human consumption - Migration assessment - Guidance on the interpretation of laboratory derived migration values

Kunststoff-Rohrleitungssysteme für den Transport von Trinkwasser für den menschlichen Verzehr - Bewertung der Migration - Anleitung für die Beurteilung von aus Laborversuchen abgeleiteten Migrationswerten

Systèmes de canalisations plastiques pour le transport d'eau destinée à la consommation humaine - Évaluation de la migration - Guide d'interprétation des valeurs de migration déterminées en laboratoire

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TECHNICAL REPORT

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English Version

Plastics piping systems for the transport of water intended for human consumption - Migration assessment - Guidance on the interpretation of laboratory derived migration values

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This Technical Report was approved by CEN on 15 May 2010. It has been drawn up by the Technical Committee CEN/TC 155.

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Contents

Page

Foreword

This document (CEN/TR 852:2010) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

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This document supersedes ENV 852:2001.

Introduction

This document was originally issued by CEN/TC 155/WG 2 as an ENV. Because of the current developments relating to contact with water intended for human consumption, CEN/TC 155 has decided not to ask for a revision of this document as a standard, but to propose instead to keep it as a Technical Report. The main objective of this is to make the information available as quickly as possible to interested groups, particularly those involved in designing the regulatory framework of harmonised standards, such as a European acceptance scheme.

EN ISO 8795 provides instructions on how to produce a migration liquid and how to calculate a migration value (M) after analysis of a migrating substance. However, EN ISO 8795 does not give information on:

a) the number of successive migration periods to be carried out;

b) how to interpret *M* values calculated from successive migration periods;

c) a method for converting the calculated *M* values into values that reflect field use conditions;

d) acceptance criteria for the duplicate *M* values obtained by testing in accordance with EN ISO 8795.

This information is included in this document (CEN/TR 852:2010). In the case of the conversion of *M* values (point c), two factors have been considered:

— a geometrical factor F_g , which is a property of the product;

— an operational factor F_o, which is calculated from the residence time of the water in contact with the product. The values of F_o quoted in this document are based on certain assumptions and/or risk analysis. These are explained in the document.

1 Scope

This Technical Report is applicable to plastics pipes, joints and fittings to be used for the transport of water intended for human consumption and raw water used for the manufacture of water intended for human consumption.

It gives guidance on:

a) the number of successive migration periods to be carried out;

b) how to interpret *M* values calculated from successive migration periods;

c) a method for converting *M* values into values that reflect field use conditions;

d) acceptance criteria for the duplicate *M* values obtained by testing in accordance with EN ISO 8795.

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 8795, *Plastics piping systems for the transport of water intended for human consumption — Migration assessment — Determination of migration values of plastics pipes and fittings and their joints (ISO 8795:2001)*

3 Terms, definitions and symbols

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

3.1 Terms and definitions

3.1.1 Terms and definitions related to acceptance limits

3.1.1.1
concentration acceptance limit (C_{al})
concentration of a constituent which shall not be exceeded

NOTE 1 It is expressed in milligrams per litre (mg/l).

NOTE 2 The limit is specified elsewhere, e.g. in national regulations.

3.1.1.2
migration acceptance limit (M_{al})
migration value for a constituent which shall not be exceeded

NOTE 1 It is expressed in milligrams per square decimetres per 24 h [mg/(dm^2 × 24 h)].

NOTE 2 The value is either specified elsewhere e.g. in national regulations or calculated from a concentration acceptance limit C_{al} (see 3.1.1.1) and a conversion factor *F* (see 3.1.3.1).

3.1.2 Terms and definitions related to categorisation of pipe lines

3.1.2.1
domestic pipe line
pipe line between the service pipe line (see 3.1.2.2) and the tap

NOTE It is assumed to have a nominal size in the range 12 to 25 inclusive.

3.1.2.2
service pipe line
pipe line between the distribution pipe line (see 3.1.2.3) and the domestic pipe line (see 3.1.2.1)

NOTE It is assumed to have a nominal size in the range 32 and 90 inclusive.

3.1.2.3
distribution pipe line
pipe line between a trunk main (see 3.1.2.4) and several service pipe lines (see 3.1.2.2)

NOTE It is assumed to have a nominal size in the range 100 to 280 inclusive.

3.1.2.4
trunk main
pipe line which transports water from the water works to the distribution pipe line (see 3.1.2.3)

NOTE It is assumed to have a nominal size of 300 and larger.

3.1.3 Terms and definitions related to conversion factors

3.1.3.1
conversion factor (*F*)

factor used to convert an experimentally derived migration value $\overline{M}^{T}_{24;n}$ (see 3.2) to $C_{f;n}$ (see 3.1.3.2)

NOTE It is expressed in days and decimetres to power minus one (day/dm).

3.1.3.2
field concentration ($C_{f;n}$)
calculated concentration of a particular constituent under assumed conditions of field use for migration period *n*

NOTE It is expressed in milligrams per litre (mg/l).

3.1.3.3
geometrical factor (F_g)
relationship between the surface area of a component of a pipe line in contact with the water and the volume of the water contained by that component (see 5.2.2)

NOTE It is expressed in decimetres to the power minus one (dm^{-1}).

3.1.3.4
operational factor (F_o)
time the water is assumed to be in contact with the component in practice (see 5.2.3)

NOTE It is expressed in days.

3.1.4 Terms and definitions related to products

3.1.4.1
fitting
component other than a pipe which is used in a pipe line (e.g. bends, tees, end caps, valves)

[EN ISO 8795:2001]

3.1.4.2
joint
connection between the ends of two components, which includes the method of sealing

[EN 1444:2000]

3.1.4.3
nominal size (DN)
numerical designation of the size of the pipe, fitting or joint, which is whole number approximately equal to the actual dimensions in millimetres (mm) as specified in the relevant System Standard

3.1.5
water
water intended for human consumption or raw water used for the manufacture of water intended for human consumption

3.2 Symbols

n : The sequence number of the migration period (see Clause 5);

$M^{T}_{24;n}$: Migration value M at the temperature T in degrees Celsius, for the migration time 24 h and the migration period n. It is expressed in milligrams per square decimetres per 24 h [mg/(dm^2 × 24 h)];

$\overline{M}^{T}_{24;n}$: The arithmetic mean value of the results of the duplicate test pieces $M^{T}_{24;n}$.

4 Principle

A maximum of ten migrations is specified.

For assessment purposes the first three and the last three migrations are used.

A procedure for the interpretation of successive migrations is provided.

Procedures are given for the conversion of laboratory derived migration values to values based on assumed conditions of field use. These values can be compared with either a concentration acceptance limit or with a migration acceptance limit.

5 Field use

5.1 General

The concentration $C_{f;n}$ shall be calculated using Equation (1):

$$C_{f,n} = F \times \overline{M}^{T}_{24;n} \quad (1)$$

where:

$C_{f;n}$ is the calculated concentration of a particular constituent under assumed conditions of field use in milligrams per litre for migration period *n*;

F is the conversion factor in decimetres power minus one and days;

$\overline{M}^{T}_{24;n}$ is the arithmetic mean $M^{T}_{24;n}$ values in milligrams per square decimetre per 24 h (day), obtained by application of the relevant test methods and the assessment in accordance with 6.2.2.

5.2 Factors

5.2.1 Conversion factor

The conversion factor *F* shall be calculated using Equation (2):

$$F = F_g \times F_o \qquad (2)$$

where:

F is the conversion factor (see 3.1.3.1);

F_g is the geometrical factor (see 3.1.3.3);

F_o is the operational factor (see 3.1.3.4).

5.2.2 Geometrical factor

The geometrical factor F_g is defined by Equation (3):

$$F_g = \frac{S}{V} \qquad (3)$$

where:

F_g is the geometrical factor (see 3.1.3.3);

S is the inner surface of the pipe, fitting or joint exposed to the water, in square decimetres (dm^2);

V is the volume of the water in the pipe, fitting or joint, in cubic decimetres (dm^3).

For practical purposes F_g shall be calculated using Equation (4):

$$F_g = \frac{400}{\mathrm{DN}} \qquad (4)$$

where:

F_g is the geometrical factor (see 3.1.3.3);

DN is the nominal size of the pipe, fitting or joint (see 3.1.4.3), in millimetres (mm).