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Influence of materials on water intended for human consumption — GC-MS identification of water leachable organic substances

National foreword

This British Standard is the UK implementation of EN 15768:2015. It supersedes BS 6920-4:2001 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EH/6, Effects of materials on water quality.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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English Version

Influence of materials on water intended for human consumption - GC-MS identification of water leachable organic substances

Influence sur l'eau des matériaux en contact avec l'eau destinée à la consommation humaine - Identification par CG-SM de substances organiques lixiviables à l'eau

Identifizierung mittels GC-MS von durch Wasser auslaugbaren organischen Substanzen aus Materialien für den Kontakt mit Trinkwasser

This European Standard was approved by CEN on 29 November 2014.

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Foreword

This document (EN 15768:2015) 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of an identical text or by endorsement, at the latest by July 2015 and conflicting national standards shall be withdrawn at the latest by July 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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This document describes methods of identification only, and should not be used or quoted as a specification.

References to this document should indicate that the methods of identification used are in accordance with EN 15678:2015.

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

Introduction

Organic substances that migrate from products containing such substances have, when used in contact with water intended for human consumption, the potential to cause health concerns for consumers. The potential health effects of these chemicals are assessed in three stages as follows:

a) preparation of migration waters by exposing a portion of the material to water under controlled conditions;

b) analysis of the migration waters;

c) assessment of the identities and concentrations of the substance detected.

The analysis of organic substances present in migration waters can involve two different types of analytical methods as follows:

d) a screening method, which allows a variety of substances to be detected and a semi-quantitative assessment to be made of their concentrations;

e) accurate quantitative methods for the determination of specific target substances known to be present in the chemical formulations of the materials.

This standard describes the analytical procedures based upon gas chromatography and mass spectrometry (GC-MS) used to screen migration waters for organic substances derived from finished products such as pipes, protective coatings, membranes, etc. This method is suitable for migration waters from all products that can potentially release organic chemicals into water when they are used in contact with water intended for human consumption, and which are the subject of an application for approval by the national regulatory body. It may be one of several methods that form part of the overall approval process. The method may also be used as part of an approval audit process. The method does not provide accurate quantitative results and other analytical methods are recommended for accurate quantitative determination of specific target substances.

1 Scope

This European Standard describes a method for detecting and identifying organic chemicals that are amenable to GC-MS analysis using the procedures described and which can migrate from a product into water intended for human consumption. This European Standard does not provide all the necessary tools to completely identify all the substances that are detected. A method of semi-quantitatively estimating the concentrations of the organic substances detected is also provided, however, concentrations should only be seen as indicative.

NOTE The method to be used for the preparation of migration waters is specified by separate ENs, as noted below.

2 Normative references

EN 12873-1, *Influence of materials on water intended for human consumption - Influence due to migration - Part 1: Test method for factory-made products made from or incorporating organic or glassy (porcelain/vitreous enamel) materials*

EN 12873-2, *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*

EN 12873-3, *Influence of materials on water intended for human consumption - Influence due to migration - Part 3: Test method for ion exchange and adsorbent resins*

EN 12873-4, *Influence of materials on water intended for human consumption - Influence due to migration - Part 4: Test method for water treatment membranes*

EN ISO 3696, *Water for analytical laboratory use - Specification and test methods (ISO 3696)*

3 Terms and definitions

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

3.1
u
atomic mass unit, defined as 1/12 of the mass of a single atom of carbon-12 in the gas phase (i.e. unbound), at rest and in its ground state

3.2
asymmetry factor
A_s
measure of the absorption of a compound during gas chromatographic analysis

Note 1 to entry: The asymmetry factor (A_s) can be derived from Formula (1).

$$A_s = \frac{(a+b)}{2b} \quad (1)$$

where

a is the distance from the leading edge of the peak at the point on the baseline where the perpendicular dropped from the peak maximum crosses it;

b is the corresponding distance from the trailing edge of the peak.

Locate the apex of the peaks that require their asymmetry values calculated. For each peak, drop a perpendicular line down at a right-angle to the baseline.