

Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water —

Part 2: Methods of test —

Section 2.2: Odour and flavour of
water —

Subsection 2.2.1: General method of test

ICS 13.060.20

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee EH/6, *Effects of materials on water quality*, upon which the following bodies were represented:

- Automatic Vending Association of Britain
- British Cement Association
- BCF — British Coatings Federation Ltd
- British Malleable Tube Fittings Association
- British Plastics Federation
- British Plumbing Fittings Manufacturers' Association
- British Precast Concrete Federation Ltd
- British Rubber Manufacturers' Association Ltd
- British Water
- DEFRA — Water and Land Directorate
- Galvanizers Association
- Laboratory of the Government Chemist
- Pipeline Industries Guild
- UK Steel Association
- Water Regulations Advisory Scheme
- Water Research Centre plc

This British Standard, having been prepared under the direction of the Health and Environment sector Committee, was published under the authority of the Standards Committee and came into effect on 15 May 2000

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Published by BSI Standards Limited 2014

The following BSI references relate to the work on this British Standard:
Committee reference EH/6
Drafts for comment
99/560125 DC, 13/30287592 DC

ISBN 978 0 580 83820 0

Amendments/corrigenda issued since publication

Amd. No.	Date	Comments
14719	21 January 2004	See national foreword
A2	30 May 2008	See Scope and Bibliography
A3	30 June 2014	See Foreword, Scope, Clauses 4, 10, 12 and Annex C.

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Foreword

Publishing information

This subsection of BS 6920 is published by BSI Standards Limited, under licence from The British Standards Institution and came into effect on 15 May 2000. It was prepared by Technical Committee EH/6, *Effects of materials on water quality*.

Supersession

BS 6920-2.2.1:2000+A3:2014 supersedes BS 6920-2.2.1:2000+A2:2008, which is withdrawn.

Relationship with other publications

BS 6920 is published in several parts, namely *Part 1: Specification*, *Part 2: Methods of test*, *Part 3: High temperature tests* and *Part 4: Method for the GCMS identification of water leachable organic substances*.

Part 2 is further subdivided into a number of sections and subsections as follows.

Section 2.1: Samples for testing;

Section 2.2: Odour and flavour of water;

Subsection 2.2.1: General method of test;

Subsection 2.2.2: Method of testing odours and flavours imparted to water by multi-layered hoses and pipes;

Subsection 2.2.3: Method of testing odours and flavours imparted to water by hoses for conveying water for food and drink preparation;

Section 2.3: Appearance of water;

Section 2.4: Growth of aquatic microorganisms test;

Section 2.5: The extraction of substances that may be of concern to public health;

Section 2.6: The extraction of metals.

Information about this document

This edition introduces technical changes but it does not reflect a full review or revision of the standard.

Major changes have been introduced to improve the overall accuracy of the method (all testing undertaken by three test panellists), and clarification of the experimental details for undertaking hot water tests using chlorinated water. Reporting requirements have been refined (on the basis of experience) and a slight modification was made to the order of the extraction temperature and sequence to assist laboratories undertaking this test.

The start and finish of text introduced or altered by Amendments No. 1, No. 2 and No. 3 is indicated in the text by tags **A1**, **A1**, **A2**, **A2** and **A3**, **A3**. Minor editorial changes are not tagged.

Hazard warnings

WARNING. This British Standard calls for the testing of extracts that might contain substances that could be injurious to the health of test panellists if adequate precautions are not taken. It is important that the guidance given in **10.1** is followed. This British standard refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Contractual and legal considerations

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

Compliance with a British Standard cannot confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 13 and a back cover.

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Introduction

WARNING. Conduct this test with due regard to the possible presence of substances in the extracts that may be hazardous to the health of the test panellists. Only products **A3** Text deleted **A3** deemed suitable for contact with water intended for human consumption in accordance with BS 6920-1:2014, Clause 7 (toxicological test) may be assessed in this test, unless details of the chemical composition and process of manufacture of the sample(s) are known, and any possible hazard can be assessed.

Instruct the test panellists not to swallow any test extract under any circumstances.

Some materials are capable of leaching into water compounds which give rise to unacceptable odours and flavours at very low concentrations.

All odour and flavour assessment procedures are subjective and fall into two basic types as follows:

- a) those which involve the assessment of a water sample and the qualitative classification on the basis of the intensity and nature of any odour or flavour;
- b) those in which a semi-quantitative determination of odour and flavour intensity is made by a group of people who assess a series of dilutions of the sample.

The method described in this subsection of BS 6920 involves a combination of both these procedures.

1 Scope

This subsection of BS 6920 describes a method designed to assess the ability of a product to impart a discernible odour and/or flavour to water intended for human consumption. The method is applicable **A2** for most **A2** types of non-metallic **A2** products **A2** used in contact with drinking water.

A2 It is not applicable for testing the following product types:

- a) **A3** multilayered pipes and hoses **A3** in which the outer material differs from the inner (water contact) material, together with barrier pipes and reinforced flexible hoses (see BS 6920-2.2.2);
- b) **A3** hoses **A3** (with or without reinforcement) for use in equipment used for food and drink (see BS 6920-2.2.3) **A2**.

NOTE 1 Procedures for testing odours and flavours imparted to water by flexible hoses (with or without reinforcement) in their final form (i.e. before assembly) and flexible hoses (with or without reinforcement) intended for use in equipment used for food and drink preparation are given in BS 6920-2.2.2 and BS 6920-2.2.3 respectively.

NOTE 2 **A3** Under the relevant National Regulations [1] to [7], the National Regulator may specify additional provisions in some cases and will assess the significance of the results obtained. **A3**

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this section of BS 6920. For dated references, subsequent amendments to or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 5586-1:1978, *Sensory analysis apparatus — Part 1: Specification for wine-tasting glass*.

BS 6920-1:2014, *Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water — Part 1: Specification*.

BS 6920-2.1:2014, *Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water — Part 2: Methods of test — Section 2.1: Samples for testing*.

BS 6920-3:2000, *Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water — Part 3: High temperature tests*.

BS EN ISO 3696:1995, *Water for analytical laboratory use — Specification and test methods*.

A3 BS EN ISO 7393:2000 (BS 6068-2.26), *Water quality — Part 2: Physical, chemical and biochemical methods — Section 2.26, Method for determination of free chlorine and total chlorine: colorimetric method using N,N-diethyl-1,4-phenylenediamine, for routine control purposes*. **A3**

3 Terms and definitions

For the purposes of this subsection of BS 6920, the following definitions apply.

3.1

test panellists

individuals who have demonstrated sensitivity to those odours and flavours in water commonly associated with non-metallic materials (see 8.2.3)

3.2

flavour threshold dilution

that dilution of the sample at which the flavour is just detectable when compared with the more dilute sample in the series under assessment

3.3

odour

organoleptic attribute perceptible by olfactory organ on sniffing certain volatile substances

 (BS EN ISO 5492) 

3.4

flavour

complex combination of the olfactory, gustatory and trigeminal sensations perceived during tasting

NOTE The flavour may be influenced by tactile, thermal, painful and/or kinaesthetic effects  (BS EN ISO 5492) .

4 Principle

 The sample of the product is immersed in two test water types (with and without 1 mg/litre free chlorine) for 24 h. These waters are then assessed for any discernible odour and, after dilution, for the presence of any discernible flavour compared with the test water blank. Depending upon the test results, then the same sample is immersed in test water for a further six sequential extraction periods, including one 72 hour period and concluding with a 24 hour period, using fresh test water for each period. The water from the final immersion period is assessed for any discernible odour and, after dilution, for any discernible flavour compared with the test water blank. The test procedure is repeated with a fresh untested sample of the product using chlorinated water. 

NOTE Annex C (informative) contains a series of flow diagrams showing the sequence of these test procedures.

5 Test premises

The assessment of odour and flavour shall be performed in a room that is free from obtrusive draughts and noise and, in which, the general environment is such that the test panellists can perform their task unobserved. No air fresheners or room deodorizers shall be used in the room, which shall be sited away from any activity that could generate interfering odours. The temperature of the room shall be $(21 \pm 4) ^\circ\text{C}$.

6 Reagents

6.1 Test water

Test water shall be of drinking quality and obtained from a tap connected directly to a service pipe at mains pressure. Before collection of the water, flush the tap until the temperature of the flowing water does not vary by more than 1 °C over a period of 1 min and does not exceed 25 °C. This water shall be judged to be free from any discernible odour or flavour by the test panellists at the beginning of each session of assessment.

NOTE In some localities, the tap water may have sufficient odour and/or flavour to potentially mask other odour and flavours produced by test materials. In this case, it is acceptable to use other water sources, including bottled (non-carbonated) and demineralized water, provided that the water is judged to be free from any discernible odour and flavour by the test panellists.

Alternatively, odourless and flavourless reference water can be prepared by treating tap water with granular activated carbon (see Annex A).

6.2 Chlorine-free test water

Accurately determine the free residual chlorine concentration in the test water (6.1) in accordance with BS 6068-2.26. Ensure by the addition of sodium thiosulfate solution (6.4) that the free residual chlorine concentration is reduced to less than 0.05 mg/l.