



EAST AFRICAN STANDARD

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

EAST AFRICAN COMMUNITY

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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Introduction

Flexible hoses are used for conveying water in equipment for food and drink preparation. Overnight, during shut-downs and at various other times, the water may be static in these hoses for varying periods of time. With a high surface area of the material of the hose exposed to a relatively small volume of water, the water may readily pick up substances from the hose capable of producing a discernible odour or flavour. Additionally, the hose may react with any residual chlorine in the water to produce a disinfectant-type odour and/or flavour.

Experience has shown that, even when the water-contact material does not produce any odour or flavour in water, when fabricated into a complete hose, substances from the outer material may interact with the water contact material in such a way as to produce such effects.

For these applications, it is therefore important not only to test the complete hose, including any reinforcements and outer layers, but to use a ratio of surface area of water-contact material to volume of water representative of the worst situation likely to be encountered in practice.

In the preparation of this East African Standard, the following source was consulted extensively:

BS 6920-2-2-3:2000, *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 2: Methods of test — Section 2.2: Odour and flavour of water — Subsection 2.2.3: Method of testing odours and flavours imparted to water by hoses for conveying water for food and drink preparation*

Assistance derived from this source and others inadvertently not mentioned is hereby acknowledged.

Draft for comments only — Not to be cited as East African Standard

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

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 comes into effect on 15 May 2000

© BSI 21 January 2004

The following BSI references relate to the work on this British Standard:
 Committee reference EH/6
 Draft for comment 99/560127 DC

ISBN 0 580 331075

Amendments issued since publication

| Amd. No. | Date | Comments |
|----------|-----------------|-----------------------------|
| 14720 | 21 January 2004 | Insertion of new Figure A.1 |
| | | |
| | | |
| | | |

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Foreword

This subsection of BS 6920 has been prepared by Technical Committee EH/6. It supersedes BS 6920-2.2.3:1996, which is withdrawn.

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

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 hoses and composite pipes and tubes;

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.

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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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 5 and a back cover.

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Introduction

Flexible hoses are used for conveying water in equipment for food and drink preparation. Overnight, during shut-downs and at various other times, the water may be static in these hoses for varying periods of time. With a high surface area of the material of the hose exposed to a relatively small volume of water, the water may readily pick up substances from the hose capable of producing a discernible odour or flavour. Additionally, the hose may react with any residual chlorine in the water to produce a disinfectant-type odour and/or flavour.

Experience has shown that, even when the water-contact material does not produce any odour or flavour in water, when fabricated into a complete hose, substances from the outer material may interact with the water contact material in such a way as to produce such effects.

For these applications, it is therefore important not only to test the complete hose, including any reinforcements and outer layers, but to use a ratio of surface area of water-contact material to volume of water representative of the worst situation likely to be encountered in practice.

1 Scope

This subsection of BS 6920 describes a method designed to assess the ability of flexible hoses (including reinforcements) to impart a discernible odour or flavour to water intended for use in the preparation of food and drinks.

It is applicable only to the testing of hoses intended for installation in equipment used for food and drink preparation.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part 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 6920, *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.*

BS 6920-2.2.1, *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.*

3 Terms and definitions

For the purposes of this subsection of BS 6920, the definitions given in BS 6920-2.2.1 apply.

4 Principle

Lengths of hose are filled with test water for 24 h. This water is assessed for the presence of any discernible odour. If none is detected it is then diluted (once) and assessed for the presence of any discernible flavour, compared to the test water blank, by test panellists. If any odour or flavour is detected then the same hoses are refilled with fresh test water for one further 24 h period. The water from this final soaking period is assessed by the test panellists. The test procedure is repeated using chlorinated test water.

NOTE 1 A flow diagram showing the sequence of the test procedures is given in Annex A.

NOTE 2 The procedures for assessing the water samples for odour and flavour are described in full in BS 6920-2.2.1.

NOTE 3 The procedures do not involve any testing of the outer layers of reinforced hoses on their own, but only as part of the complete hoses.

NOTE 4 This procedure involves the preparation of only two sequential extracts from the test samples, compared with the seven extracts prepared from test samples in BS 6920-2.2.1 and BS 6920-2.2.2.

5 Reagents

The reagents shall be as given in BS 6920-2.2.1.

6 Apparatus

The apparatus shall be as given in BS 6920-2.2.1.

7 Samples

Samples of hoses shall conform to BS 6920-2.1:2000, 5.2.9. If samples are taken from a reel of hose, two samples shall be taken from one end of the reel, and two samples from the other end.

8 Test procedure

8.1 General

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 found to conform to the microbial growth test requirement in accordance with BS 6920-1:2000, Clause 6 and deemed suitable for contact with water intended for human consumption in accordance with BS 6920-1:2000, 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.

8.2 Extraction procedures

8.2.1 Chlorine-free water

8.2.1.1 Extraction

On the same day as testing is to start, rinse the inner surface of four 1 m lengths of the hose (see Clause 7) using a minimum of 10 l of chlorine-free test water for each (see BS 6920-2.2.1:2000, 6.2). Clamp two 1 m lengths of hose, one from each end of the reel, in a "U" bend configuration. Completely fill each length of hose using chlorine-free test water. Cover each end of the hoses with a fresh piece of aluminium foil. In addition, fill an empty 1 l test container conforming to BS 6920-2.2.1:2000, 7.1 with chlorine-free test water; this constitutes the blank test.

Seal the containers with fresh pieces of aluminium foil.

Store the hose under test and the containers of water at either $(23 \pm 2)^\circ\text{C}$ for (24 ± 1) h for cold water testing, or at the selected temperature in the case of high temperature tests in accordance with BS 6920-3.

8.2.1.2 Dilution

At the end of the storage period, unclamp the hoses and transfer the contents of the hose to separate appropriately sized clean glass graduated measuring cylinders conforming to BS 604 and determine and record the volume of the water.

To the water samples from the hoses add equal volumes of fresh chlorine-free test water (see BS 6920-2.2.1:2000, 6.2). In the same way prepare a dilution of the blank test water.

Instruct the test panellists to assess these samples in accordance with 8.3.

8.2.2 Chlorinated water

Repeat the procedure described in 8.2.1.1 using the other two lengths of hose (see Clause 7) and chlorinated test water (see BS 6920-2.2.1:2000, 6.3) instead of chlorine-free water.

After the extraction period, neutralize any free residual chlorine in the water from the hoses in accordance with BS 6920-2.2.1:2000, 10.4.2, prepare the dilution (see 8.2.1.2) and instruct the test panellists to assess the dilution prepared using chlorine-free water (see 8.3).

8.3 Testing procedure

8.3.1 Temperature of test solution

Adjust the temperature of the dilutions to $(25 \pm 1)^\circ\text{C}$ by placing the beakers containing the dilutions in a temperature-controlled water bath (see BS 6920-2.2.1:2000, Annex B).

8.3.2 Assessment of extract(s) and their dilutions

8.3.2.1 Odour assessment

Remove the sample extracts (one for each length of test hose) and the reference water from the water bath or incubator. Transfer 100 ml of each sample extract and the reference water to clean 250 ml flasks with a neck diameter of at least 45 mm, stopper the flasks and, if necessary, re-adjust the temperature to $(25 \pm 1) ^\circ\text{C}$.

Ask the assessor to shake each flask thoroughly, remove the stopper, immediately smell the extract, and record his/her decision compared with the reference water.

If there is no perceived difference between the test extracts and the reference water describe the test extract as odourless and proceed with flavour assessment (8.3.2.2).

If an odour is perceived in the extracts from either hose sample, repeat the extraction procedure (8.2.1.1) one more time. Assess these extracts for odour as set out above; if they are free from discernible odour undertake an assessment of flavour on them (8.3.2.2).

NOTE A list of odours and flavours commonly encountered is given in BS 6920-2.2.1:2000, Annex B.

8.3.2.2 Flavour assessment

Do not undertake this assessment until an odour assessment (8.3.2.1) has been undertaken and the extract is free from discernible odour.

Remove the dilution of the blank test from the water bath and pour off (30 ± 5) ml of the water into a clean tasting glass (see BS 6920-2.2.1:2000, 7.4). Instruct each test panellist to take into the mouth whatever volume of water is comfortable and to hold it in the mouth for several seconds before discharging it without swallowing. Rinse the tasting glass thoroughly with chlorine-free water (see BS 6920-2.2.1:2000, 6.2) between samples.

If a flavour is detected in the dilution of the blank water, then start the complete test again from the beginning of Clause 8 using fresh samples, fresh test water and fresh test containers.

Similarly assess the dilutions of the test sample extracts.

If no flavour is detected in either of the diluted extracts, record this result and discontinue the test.

NOTE A list of odours and flavours commonly encountered is given in BS 6920-2.2.1:2000, Annex B.

8.4 Repeat testing

If an odour or flavour is detected record a description of them and, using the same two hose samples and the same type of test water, repeat once more the procedure in 8.1 and 8.2, as appropriate, ending with the testing of the final extracts.

NOTE A list of odours and flavours commonly encountered is given in BS 6920-2.2.1:2000, Annex B.

9 Expression of results

Express the results in accordance with BS 6920-2.2.1:2000, Clause 11.

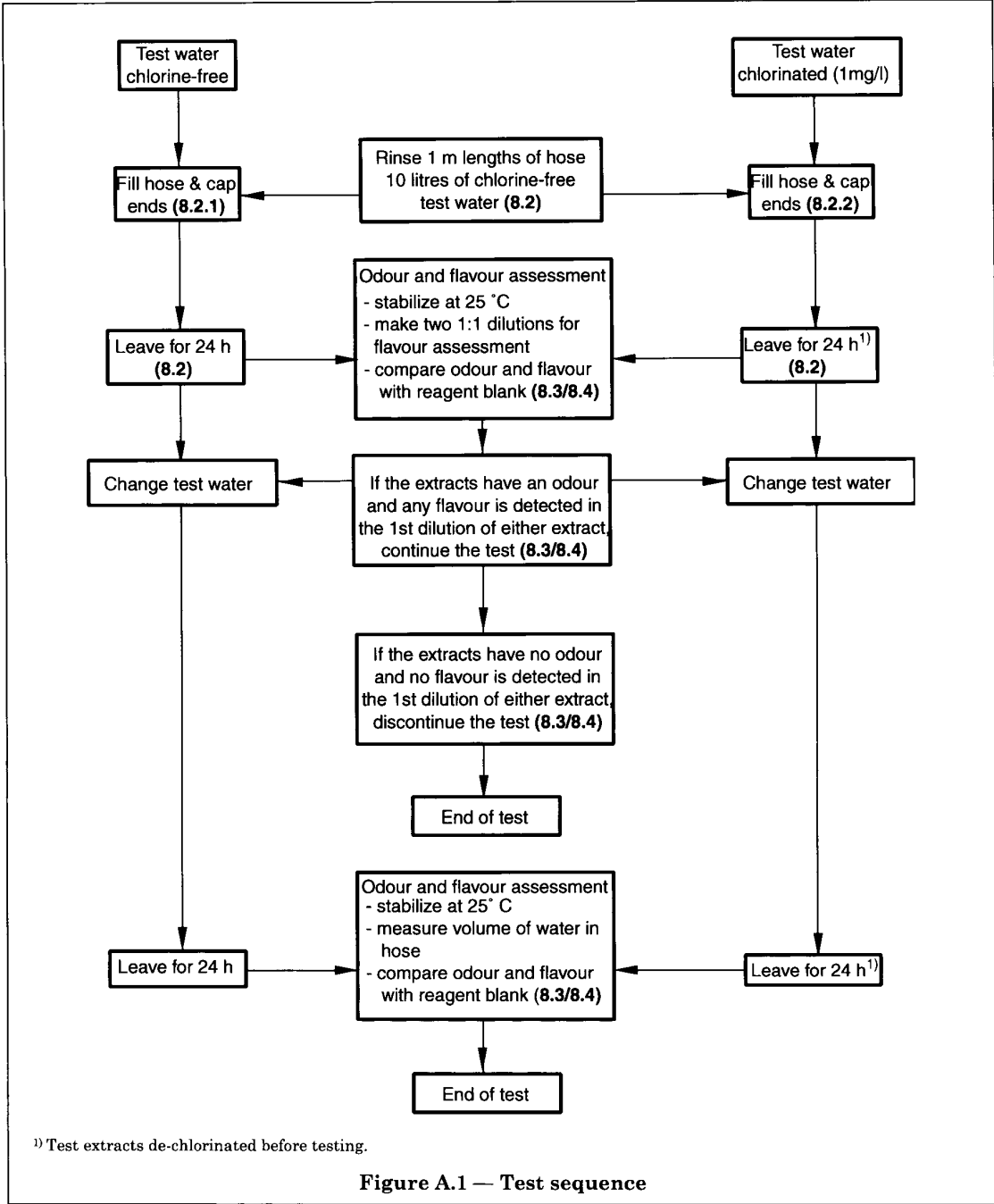
10 Test report

In addition to the requirements for the test report given in BS 6920-2.2.1:2000, Clause 12, the report shall include the following particulars:

- a description of the hose, including details of reinforcements and outer coverings;
- a statement saying that extracts were prepared by filling lengths of hose with test water and subsequently diluting this with an equal quantity of test water;
- the length of the test samples;
- the internal diameter of the test samples;
- the surface area of the material in contact with the test water;
- the volume of test water contained within the test sample during extraction;
- whether an odour was detected in either of the first or second extracts from either of the hose samples;
- whether a flavour was detected in the dilution of either the first or second extracts from either of the hose samples.

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Annex A (informative)
Test sequence



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