BRITISH STANDARD

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Incorporating Corrigendum No. 1

Jug water filter systems—

Specification

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Contents

Foreword

This British Standard has been prepared under the direction of Technical Committee B/504 to reflect the growing use of jug water filter systems.

The start and finish of text introduced by Corrigendum No. 1 is indicated in the text by tags C1〉 〈C1.

Regarding possible unfavourable effects of the products to which this standard applies on the quality of water for human consumption, note that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or characteristics of this product remain in force (see **4.2**).

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 15 and a back cover.

Introduction

Jug water filter systems are increasingly being used by the public to modify the qualities of domestic tap water. The jug water filter systems specified in this British Standard are not designed to be used for the reduction of micro-organisms. They are designed to be used with drinking water only.

Valid and reliable test protocols are needed to evaluate the performance of different water treatment systems in filtering drinking water. Owing to the complexity of the parameters that have an impact on the test results it is important to follow a specific filtration testing procedure. In particular, tests for certain metals such as lead can produce different results if a particular filtration procedure is not followed.

This standard includes a detailed protocol for preparation of challenge water and performance testing; the spiking levels specified enable the reduction of specified substances to be assessed but can be higher than would normally be encountered in public drinking water supplies.

1 Scope

This British Standard specifies requirements for the performance and labelling of jug water filter systems used for the domestic treatment of drinking water only.

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.

BS 6920-1, *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 — Specification.*

BS 6920-2.1, *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 2.1: Samples for testing.*

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.*

BS 6920-2.3, *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 2.3: Appearance of water.*

BS 6920-2.4, *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 2.4: Growth of aquatic micro-organisms test.*

BS 6920-2.5, *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 2.5: The extraction of substances that may be of concern to public health.*

BS 6920-2.6, *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 2.6: The extraction of metals.*

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

BS EN ISO 7393-2, *Water quality — Determination of free chlorine and total chlorine — Part 2: Colorimetric method using N,N-diethyl-1,4-phenylenediamine, for routine control purposes.*

BS EN 12915-1, *Products used for the treatment of water intended for human consumption — Granular activated carbon — Part 1: Virgin granular activated carbon.*

3 Terms and definitions

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

3.1
cartridge
replaceable/rechargeable container that contains the **filtration medium (3.5)** through which the unfiltered water passes

NOTE This will normally be attached to, or placed within, the **hopper (3.7)**.

3.2
cartridge exchange indicator
device by which the need to change a **cartridge (3.1)** is indicated

NOTE It can work, for example, by elapsed time or throughput of water.

3.3
challenge water
medium used in the testing of the performance of the **jug water filter system (3.9)**

NOTE This is prepared by the addition of test chemicals to analytical grade water.

3.4
drinking water
water of a quality suitable for drinking purposes
[BS 6068-1.1:2004, definition **30**]

3.5
filtration medium
medium through which the unfiltered water passes

NOTE This can, for example, consist of activated carbon or ion exchange resins or a mixture of these.

3.6
filtrate
drinking water (3.4) that has been treated by a **jug water filter system (3.9)**

3.7
hopper
separate, removable chamber that contains the unfiltered water

3.8
jug
receptacle that collects the **filtrate (3.6)**

3.9
jug water filter system
free-standing water filtration system, i.e. not connected to the **drinking water (3.4)** supply

3.10
limit of quantification
lowest concentration of a determinand, in a sample, that can be determined quantitatively

NOTE Limit of quantification is calculated as 4.65 times the relative within-batch standard deviation of a blank sample.

4 Components and materials

4.1 Components

The jug water filter system shall comprise some or all of the following:

- — jug;
- — hopper;
- — cartridge/filtration medium;
- — cartridge exchange indicator;
- — lid.

NOTE The components of a jug water filter system can vary and might include parts other than those listed. However, this list is representative of most jug water filter systems currently available.

4.2 Materials

Non-metallic materials in contact with water, except activated carbon, shall satisfy the requirements of BS 6920-1 when tested according to BS 6920-2.1, BS 6920-2.2.1, BS 6920-2.3, BS 6920-2.4, BS 6920-2.5 and BS 6920-2.6.

Activated carbon shall conform to BS EN 12915-1.

5 Performance

When tested in accordance with Clause **6** against the claim made by the manufacturer in accordance with Clause **7**, the jug water filter system shall not exceed the maximum permissible concentrations in the filtrate for at least one of the claimed determinand(s) in Table 1 or both of those in Table 2.

Table 1 — Chemical concentration requirements

Determinand	Units	Concentration in the challenge water	Concentration in the filtrate (max.)	
			Grand mean	Maximum daily mean
Aluminium	µg/l as Al	200	50	100
Chlorine	mg/l as Cl_2	1	0.2	0.3
Copper	mg/l as Cu	3	0.5	1
Carbonate hardness	mg/l as $CaCO_3$	200	120	140
Lead	µg/l as Pb	100	10	20
Nitrate	mg/l as NO_3	50	10	20

NOTE The method for calculating the grand mean and the maximum daily mean is given in **6.9**.

Table 2 — Taste and odour concentration requirements

Determinand	Units	Concentration in the challenge water	Concentration in the filtrate (max.)	
			Grand mean	Maximum daily mean
2,4,6-TCP[a]	µg/l as 2,4,6-TCP	5	2.5	2.5
Geosmin[b]	µg/l as geosmin	0.05	0.025	0.025

NOTE The method for calculating the grand mean and the maximum daily mean is given in **6.9**.

[a] 2,4,6-trichlorophenol

[b] 2,6-dimethylbicyclo[4.4.0]decan-l-ol

There is no regulated limit governing the amount of silver within filtered water. However, to conform to this standard, if the cartridge incorporates silver, when analysed in accordance with **6.8**, the average silver concentration in the filtrate shall not exceed 0.05 mg/l for the life of the cartridge. If the manufacturer's instructions stipulate that an amount of water should be discarded before commencement of use then those instructions shall be followed before testing is carried out.1)

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1) The average concentration of silver in the filtrate from a jug filter is expected to be less than the 50 µg/l limit included in this standard. Taking account of the anticipated consumer usage profile for jug filters, the level of exposure to silver arising from the use of jug filters is expected to be not significantly greater than exposure allowed via current approval for intermittent use in public water supplies.

6 Test methods

6.1 Reagents and stock solutions

6.1.1 *Reagents*

Analytical grade reagents and water conforming to Grade 2 or better of BS EN ISO 3696.

6.1.2 *Stock solutions*

Stock solutions prepared as in Annex A.

6.2 Apparatus

6.2.1 *Storage tank*, sealable, light-tight container covered with lid, tarpaulin or floating cover and equipped with a stirrer or re-circulating pump.

6.2.2 *Analytical balance*, capable of weighing to ±1 mg.

6.2.3 *Volumetric glassware.*

6.2.4 *Plastics or glass sample bottles.*

6.2.5 *Calibrated pipettes or syringes.*

6.3 Preparation

6.3.1 *Preparation of storage tank*

Flush the storage tank (**6.2.1**) to remove any sediment.

Fill the storage tank (**6.2.1**) with water, adding 7.5 ml ± 0.5 ml of a sodium hypochlorite solution with an available chlorine concentration of (12 ± 1) % by mass per litre of water in the tank.

Stir or pump for a minimum of 30 min to sanitize.

Discard the chlorinated water and flush the storage equipment with water.

6.3.2 *Preparation of challenge water*

Prepare the challenge water as described in Annex B.

Store the challenge water in the storage tank (**6.2.1**).

6.3.3 *Preparation of the jug water filter system*

Assemble and condition the jug water filter system(s) to be tested, in accordance with the manufacturer's instructions.

6.4 Sampling schedule

Sample both challenge water and composite sample and analyse in accordance with **6.8** on days in the filtration cycle where 5 %, 15 %, 25 %, 50 %, 75 % and 100 % of the claimed total filtration capacity for the jug water filter system are reached.

NOTE See Annex C for examples of filtering and sampling schedules.

6.5 Procedure — Metal reduction

6.5.1 *General*

Test each metal separately.

6.5.2 *Sampling — Challenge water*

Take a sample of the challenge water (**B.2**) for analysis in accordance with **6.8**.

6.5.3 *Filtration*

Taking account of the manufacturer's instructions for care during use, place a maximum of one litre (or a volume not exceeding 2 % of the manufacturer's claimed capacity for the jug water filter system) of challenge water (**B.2**) in the hopper of each jug water filter system.

Allow the challenge water (**B.2**) to filter into the jug. Leave to stand for 30 min.

Empty the filtrate from each filtration of each jug into a storage vessel.

Perform this process five times within one day.

Repeat this process on a further four consecutive days.

Cease filtration for two days.

Recondition each jug water filter system in accordance with the manufacturer's instructions for action following periods of two days' non-use.

Repeat this process of five days' filtration followed by two days' break until 100 % of the claimed capacity for the jug water filter systems has been filtered, e.g. 100 l claimed capacity equals 20 filtering procedures.

6.5.4 *Sampling — Composite samples*

On non-sampling days discard the filtrate.

On sampling days (see **6.4**) acidify each sample of filtrate immediately, according to the requirements of the analytical method chosen, and mix all of the water filtered in the jug that day to form a composite sample for each jug water filter system.

NOTE Typically, nitric acid (ρ = 1.42 g/ml) is added to provide an acid concentration of 1 % by volume.

Analyse the composite samples for each jug water filter system in accordance with **6.8**.

6.6 Procedure — Hardness, nitrate and chlorine reduction

6.6.1 *Sampling — Challenge water*

Take a sample of the challenge water (**B.3**). Analyse, in accordance with **6.8**, immediately before commencing filtration.

6.6.2 *Filtration*

Taking account of the manufacturer's instructions for care during use, place a maximum of one litre (or a volume not exceeding 2 % of the manufacturer's claimed capacity for the jug water filter system) of challenge water (**B.3**) in the hopper of each jug water filter system.

Allow the challenge water (**B.3**) to filter into the jug. Leave to stand for 30 min.

Empty the filtrate from each filtration from each jug into a storage vessel.

Perform this process five times within one day.

Repeat this process on a further four consecutive days.

Cease filtration for two days.

Recondition each jug water filter system in accordance with the manufacturer's instructions for action following periods of two days' non-use.

Repeat this process of five days' filtration followed by two days' break until 100 % of the claimed capacity for the jug water filter systems has been filtered, e.g. 100 l claimed capacity equals 20 filtering procedures.

6.6.3 *Sampling — Composite samples*

On non-sampling days discard the filtrate.

On sampling days (see **6.4**) where sampling for hardness or nitrate take each litre of filtrate and mix to form a composite sample for each jug water filter system.

Analyse the composite sample for each jug water filter system in accordance with **6.8**.

On sampling days (see **6.4**) where sampling for chlorine, sample and analyse (**6.8**) the first and last litres of filtrate for each jug water filter system immediately after filtration.

6.7 Procedure — Taste and odour reduction/improvement

6.7.1 *General*

Test 2,4,6-TCP and geosmin reduction separately.

6.7.2 *Sampling — Challenge water*

Take a sample of the challenge water (**B.4**) for analysis in accordance with **6.8**.

6.7.3 *Filtration*

Taking account of the manufacturer's instructions for care during use, place a maximum of one litre (or a volume not exceeding 2 % of the manufacturer's claimed capacity for the jug water filter system) of challenge water (**B.4**) in the hopper of each jug water filter system.

Allow the challenge water (**B.4**) to filter into the jug. Leave to stand for 30 min.

Empty the filtrate from each filtration from each jug into a storage vessel.

Perform this process five times within one day.

Repeat this process on a further four consecutive days.

Cease filtration for two days.

Recondition each jug water filter system in accordance with the manufacturer's instructions for action following periods of two days' non-use.

Repeat this process of five days' filtration followed by two days' break until 100 % of the claimed capacity for the jug water filter systems has been filtered, e.g. 100 l claimed capacity equals 20 filtering procedures.

6.7.4 *Sampling*

On non-sampling days discard the filtrate.

On sampling days (see **6.4**) sample and analyse (see **6.8**) the first and last litres of filtrate for each jug water filter system immediately after filtration.

6.8 Analytical methods

Determine the concentration of free chlorine in accordance with BS EN ISO 7393-2.

Carry out analysis for other determinands using validated methods that conform to the performance requirements specified in Table 3.

NOTE Examples of analytical methods which may be used to analyse the concentration of determinands other than chlorine are given in Annex D.

Table 3 — Performance characteristics of analytical methods

Determinands	Units	Limit of quantification
2,4,6-TCP	µg/l as TCP	0.01
Aluminium	µg/l as Al	10
Copper	µg/l as Cu	50
Geosmin	µg/l as geosmin	0.004
Carbonate and total hardness	mg/l as $CaCO_3$	10
Lead	µg/l as Pb	2
Nitrate	mg/l as NO_3	1
Silver	µg/l as Ag	5

6.9 Expression of results

Example test result sheets are given in Annex E.

For each substance tested, calculate:

- — daily mean: for each sampling day, the arithmetic mean of the concentration in the composite sample (for chlorine, or taste and odour the arithmetic mean of the first and last samples) from all of the jug water filter systems tested;
- — maximum daily mean: the highest of the daily mean values;
- — grand mean: the arithmetic mean of the concentration in the composite sample from each of the jug water filter systems tested on all sampling days;
- — volume, in litres, of water filtered that meets the requirements specified in Clause **5**.

7 Marking and labelling

The manufacturer shall as a minimum state the following on the packaging:

- — manufacturer's address and contact details;
- — number and year of this British Standard;
- — determinand(s) for which this British Standard is being claimed (this may, for example, be expressed as BS 8427:2004 — Lead);
- — product batch code;
- — total cartridge capacity in litres.

All claims made to this British Standard shall be clearly separated from other claims or information.

The manufacturer's/supplier's packaging shall clearly state that the capacity claims of the cartridge are tested on its systems/jug water filter systems only.

The manufacturer/supplier shall not make any specific reduction claims for their cartridge used within another manufacturer's jug water filter system, or state that the product has been tested on another manufacturer's/supplier's jug water filter system.

8 Manufacturer's instructions for use

The manufacturer shall include instructions on preparation, putting the jug water filter system into operation and its subsequent hygienic handling and use. This shall include advice regarding the volume of water that needs to be flushed through the jug water filter system before commencing use, and instructions for use of the jug water filter system following prolonged non-use.

The manufacturer shall provide instructions on how and when to change the cartridge. These shall include a recommendation of the maximum period of time after which the cartridge should be changed. This period shall not exceed eight weeks.

The manufacturer shall state the total capacity of the cartridge, in litres. Any claims relating to lifetime of the cartridge shall be based on a *minimum* daily usage of three litres per day.

The manufacturer shall clearly state on the external packaging of the jug water filter system that it is designed to be used with drinking water only.

The manufacturer shall provide advice to boil the filtered water in the event of a "boil water notice" or similar emergency, and to dispose of any filter cartridges in use when the "boil water notice" period is over.

Annex A (normative)
Preparation of stock solutions

A.1 Water

In each instance in Annex A, water shall be of Grade 2 or better as given in BS EN ISO 3696:1995.

A.2 Calcium

Dissolve 65.6 g ± 0.1 g $CaCl_2.2H_2O$ in water and dilute to one litre in a volumetric flask.

A.3 Magnesium

Dissolve 38.0 g ± 0.1 g $MgSO_4.7H_2O$ in water and dilute to one litre in a volumetric flask.

A.4 Hydrogen carbonate

Dissolve 67.2 g ± 0.1 g $NaHCO_3$ in water and dilute to one litre in a volumetric flask.

A.5 Nitrate

Dissolve 16.3 g ± 0.01 g KNO_3 in water and dilute to one litre in a volumetric flask.

A.6 Metals

Prepare each of the stock solutions listed in Table A.1 separately. Weigh the salt into a 500 ml glass beaker, dissolve in 200 ml of water, acidify with 10 ml of concentrated nitric acid (HNO_3, $\rho = 1.42$ g/ml). Transfer into a 1000 ml volumetric flask, using a further 400 ml water to rinse the glass beaker, then fill up to the mark with water.

NOTE The stock solution may be stored for six months.

Table A.1 — Preparation of metal stock solutions

Metal	Salt	Amount, mg
Al	$Al(NO_3)_3.9H_2O$	2 780
Cu	$Cu(NO_3)_2.3H_2O$	11 430
Pb	$Pb(NO_3)_2$	160

A.7 Taste and odour compounds

A.7.1 *2,4,6-trichlorophenol stock solution*

Prepare a solution containing 100 mg/l 2,4,6-TCP in water.

A.7.2 *2,4,6-trichlorophenol working solution*

Dilute 5 ml of 2,4,6-TCP stock solution (**A.7.1**) to 100 ml with water in a volumetric flask. Prepare this solution immediately before use.

A.7.3 *Geosmin stock solution*

Prepare a solution containing 1 mg/l geosmin in water.

A.7.4 *Geosmin working solution*

Dilute 5 ml of geosmin stock solution (**A.7.3**) to 100 ml with water in a volumetric flask. Prepare this solution immediately before use.

Annex B (normative)
Preparation of challenge water

B.1 General

Prepare fresh challenge water daily, using stock solutions prepared as in Annex A. Stir the solution constantly during the spiking process.

B.2 Challenge water for metal reduction

Fill the storage tank with water. As it is filling, add 2.5 ml of each of the stock solutions for calcium (**A.2**), magnesium (**A.3**), and hydrogen carbonate (**A.4**) per litre of water.

Mix for 10 min from the point of the last addition in order to allow stabilization.

Measure hardness and alkalinity.

NOTE 1 Examples of methods for measuring hardness and alkalinity are given in Annex D.

The concentrations for the spiked parameters shall be:

[C1⟩hardness	$\left(150\,^{+30}_{-15}\right)$	mg/l as $CaCO_3$; and⟨C1]
alkalinity	$\left(100\,^{+20}_{-10}\right)$	mg/l as $CaCO_3$.

Adjust the pH of the challenge water to 7.0 ± 0.5 with sodium hydroxide (NaOH, 6 mol/l) or concentrated hydrochloric acid (HCl, $\rho = 1.18$ g/ml).

NOTE 2 Examples of methods for measuring pH are given in Annex D.

Add one millilitre of the stock solution of the particular metal to be tested per litre of water.

The concentrations of the spiked parameters shall be:

lead	$\left(0.10\,^{+0.02}_{-0.01}\right)$	mg/l;
aluminium	$\left(0.20\,^{+0.04}_{-0.02}\right)$	mg/l; and
copper	$\left(3.00\,^{+0.60}_{-0.30}\right)$	mg/l.

Stir or pump for one hour before using for the metal reduction test.

Measure the pH and adjust the pH of the challenge water to 7.0 ± 0.5 with sodium hydroxide (NaOH, 6 mol/l) or concentrated hydrochloric acid (HCl, $\rho = 1.18$ g/ml) if necessary.

B.3 Challenge water for hardness, nitrate and chlorine reduction

Fill the storage tank with water. As it is filling, add 5 ml of each of the stock solutions for calcium **A.2**, magnesium **A.3**, and hydrogen carbonate **A.4** per litre of water.

Mix for 10 min from the point of the last addition in order to allow stabilization.

Measure hardness and alkalinity.

NOTE 1 Examples of methods for measuring hardness and alkalinity are given in Annex D.

The concentrations for the spiked parameters shall be:

hardness	$\left(300\ ^{+60}_{-30}\right)$	mg/l as $CaCO_3$; and
alkalinity	$\left(200\ ^{+40}_{-20}\right)$	mg/l as $CaCO_3$.

If nitrate reduction is to be tested add five millilitres of nitrate stock solution (**A.5**) per litre of challenge water.

Adjust the pH of the challenge water to 7.5 ± 0.5 with sodium hydroxide (NaOH, 6 mol/l) or concentrated hydrochloric acid (HCl, ρ = 1.18 g/ml).

If chlorine reduction is to be tested, add sodium hypochlorite or another suitable source of free chlorine to reach a concentration of $1\left(^{+0.2}_{-0.1}\right)$ mg/l of free chlorine.

NOTE 2 For better accuracy, pre-dilution of the sodium hypochlorite is recommended.

NOTE 3 The chlorine concentration should always be within the required range. Therefore, it is recommended that after addition of the sodium hypochlorite stirring of the water should be minimized and the tank should be closed during the test.

The concentrations of the spiked parameters shall be:

nitrate	$\left(50\ ^{+10}_{-\ 5}\right)$	mg/l as NO_3; and
free chlorine	$\left(1.0\ ^{+0.2}_{-0.1}\right)$	mg/l

B.4 Challenge water for taste and odour reduction/improvement

Fill the storage tank with water. As it is filling, add 2.5 ml of each of the stock solutions for calcium (**A.2**), magnesium (**A.3**), and hydrogen carbonate (**A.4**) per litre of water.

Mix for 10 min from the point of the last addition in order to allow stabilization.

Measure hardness and alkalinity.

NOTE Examples of methods for measuring hardness and alkalinity are given in Annex D.

The concentrations for the spiked parameters shall be at least:

hardness	$\left(150\ ^{+30}_{-15}\right)$	mg/l as $CaCO_3$; and
alkalinity	$\left(100\ ^{+20}_{-10}\right)$	mg/l as $CaCO_3$.

Adjust the pH of the challenge water to 7.0 ± 0.5 with sodium hydroxide (NaOH, 6 mol/l) or concentrated hydrochloric acid (HCl, ρ = 1.18 g/ml).

Add one millilitre of the working solution of the determinand to be tested (2,4,6-TCP **A.7.2**, or geosmin **A.7.4**) per litre of water.

The concentration of the spiked parameters shall be:

2,4,6-TCP	$\left(5.0\ ^{+1.0}_{-0.5}\right)$	µg/l as 2,4,6-TCP; and
geosmin	$\left(0.050\ ^{+0.010}_{-0.005}\right)$	µg/l as geosmin.

Annex C (informative)
Example filtering and sampling schedule

C.1 Introduction

The following example illustrates the sampling schedule for a cartridge with a claimed capacity of 100 l assuming filtration of 5 l per day.

The operator should use this procedure, as given in **6.5**, to produce a similar working table for cartridges of capacities differing from the example given. In instances where fractions of capacity yield half or quarter litres, an alternative method may be adopted provided it is documented. For example: 25 % capacity of a cartridge with a capacity of 125 l would be 31.25 l. One possible approach would be to collect a composite sample of litre numbers 31, 32, 33, 34 and 35, i.e. the total challenge water filtrate of that day.

C.2 Example sampling schedule for cartridge of claimed capacity of 100 l

The following example illustrates the sampling schedule for a cartridge of claimed capacity of 100 l.

The bold italic figures represent the point at which a sample is due according to the regime given in **6.5**, i.e. 5 %, 15 %, 25 %, 50 %, 75 % and 100 %. The figures underlined are the samples that should be collected in a vessel. A sample of that composite filtered water should then be used for analysis.

Table C.1 — Example

Actual day	Test day	Volume filtered, litres				
1	1	1	2	3	4	***5***
2	2	6	7	8	9	10
3	3	11	12	13	14	***15***
4	4	16	17	18	19	20
5	5	21	22	23	24	***25***
6		two-day break from filtering				
7						
8	6	26	27	28	29	30
9	7	31	32	33	34	35
10	8	36	37	38	39	40
11	9	41	42	43	44	45
12	10	46	47	48	49	***50***
13		two-day break from filtering				
14						
15	11	51	52	53	54	55
16	12	56	57	58	59	60
17	13	61	62	63	64	65
18	14	66	67	68	69	70
19	15	71	72	73	74	***75***
20		two-day break from filtering				
21						
22	16	76	77	78	79	80
23	17	81	82	83	84	85
24	18	86	87	88	89	90
25	19	91	92	93	94	95
26	20	96	97	98	99	***100***

Annex D (informative)
Analytical methods

D.1 General

The following analytical methods can be used to determine the concentration of the determinands in Table 1, Table 2 and Table 3 and to measure hardness, alkalinity and pH.

D.2 2,4,6-TCP

Method as given in *The Determination of Microgram and Submicrogram Amounts of Individual Phenols in River and Potable Waters* [1].

D.3 Alkalinity

Method as given in BS EN ISO 9963-1.

D.4 Aluminium

Method as given in BS 6068-2.49.

D.5 Copper

Method C as given in BS 6068-2.29.

D.6 Geosmin

Method as given in Krasner, et al., 1983 [2].

D.7 Hardness

Method as given in BS EN ISO 7980.

D.8 Lead

Method B as given in *Lead and Cadmium in Fresh Waters by Atomic Absorption Spectrophotometry* [3].

D.9 Nitrate

Method as given in BS 6068-2.36.

D.10 pH

Method as given in BS 6068-2.50.

D.11 Silver

Method as given in *Silver in Waters, Sewages and Effluents by Atomic Absorption Spectrophotometry Tentative Methods* [4].

Annex E (informative)
Example test result sheets

E.1 Example test result sheet for chlorine reduction, or taste and odour reduction

The following example result sheet should be used to record results of the chlorine, or taste and odour reduction tests.

% of claimed capacity	Date	Cumulative volume filtered (l)	Concentration (units)						
			1st litre			5th litre			Daily mean
			Challenge water	Filter 1	Filter 2	Challenge water	Filter 1	Filter 2	
5									
15									
25									
50									
75									
100									
Grand mean									

E.2 Example test result sheet for all other determinands

The following example result sheet should be used to record results of the test for the reduction of all determinands (other than chlorine, or taste and odour).

% of claimed capacity	Date	Time	Cumulative volume filtered (l)	Concentration in composite sample (units)			
				Challenge water	Filter 1	Filter 2	Daily mean
5							
15							
25							
50							
75							
100							
Grand mean							

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