



Private Water Supplies Sampling Procedures Manual

Version 4.0

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Legislative background

This sampling manual forms the basis of a BS EN ISO/IEC 17024 for “The Certification of Persons Scheme for the Sampling of Private Water supplies”. It accords with both The Private Supplies (England) Regulations 2016, The Private Water Supplies (England) (Amendment) Regulations 2018 and The Private Water Supplies (Wales) Regulations 2017, hereafter collectively referred to as the Regulations. It sets out a common standard of sampling practice for monitoring private water supplies by local authorities (or their contracted sampling service companies).

The Regulations require that local authorities in England and Wales monitor (sample and analyse) private water supplies in accordance with the supply type (regulations 8, 9, 10 and 11 in Wales). They do not require local authorities to monitor supplies to single untenanted dwellings unless they are requested to do so by the dwelling owner or occupier, but they may monitor these supplies in accordance with regulation 10 (1) In England and 11 in Wales.

Local authorities and any sampler contracted to act on their behalf must ensure that samples of private water supplies that are taken for regulatory purposes are taken promptly by a person competent to perform this task. In so doing the sampler must be compliant with the BS EN ISO/IEC 17024 or 17025 standard as required by the regulations, which includes sample handling, transportation, and storage prior to analysis. Local authority samplers and those working on their behalf must ensure that a person accredited by The United Kingdom Accreditation Service (UKAS) checks, from time to time, a local authority’s compliance with these requirements.

The term “monitoring” refers to the taking of samples and their subsequent analysis (testing) by a laboratory. Monitoring may be undertaken on a one-off ad-hoc basis or carried out regularly to a defined frequency. Sampling is the act of filling bottles to a prescribed method in the correct order for laboratory analysis. One sample may be required for the testing of multiple parameters and therefore includes different bottle types. These must be taken in the correct order (see section 6).

The scope of accreditation under the scheme manual covers sampling only. It does not cover laboratory analytical procedures. Private water supply samples taken for regulatory purposes must be analysed in accordance with the BS EN ISO/IEC 17025 standard.

Regarding sampling, the Regulations specify that the local authority ensures that:

- The sample is representative of the quality of the water at the time of sampling.
- The person taking the sample is doing so in accordance with a system of quality control to an appropriate standard.
- The sample is not contaminated in the course of being taken.
- The sample is kept at such a temperature and in such a condition as will

secure that there is no material alteration of the concentration or value for the measurement or observation of which the sample is intended.

- The sample is analysed, whether at the time and place it is taken or as soon as reasonably practicable after it is taken – by or under supervision of a person who is competent to perform that task.

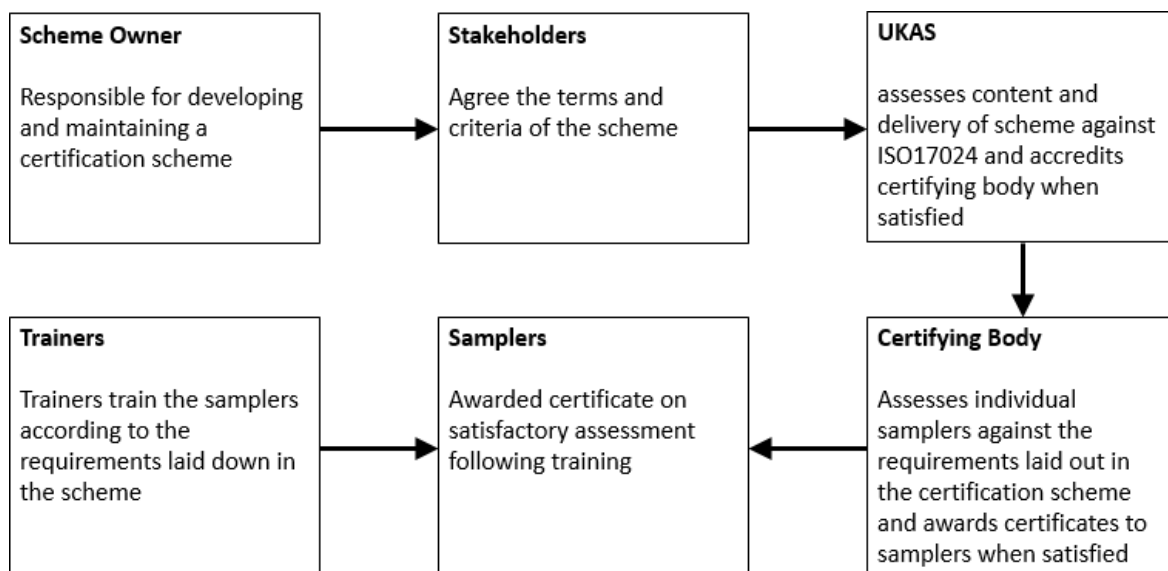
UKAS Accreditation of certified sampling by BS EN ISO/IEC 17024

A sampler must be certified by a designated certification body. The certification body shall be appointed by the scheme owner, namely The Drinking Water Inspectorate. The sampling manual shall form the basis of the scheme and shall be agreed by a committee of stakeholders.

The certification body shall be accredited by UKAS to demonstrate that it is compliant with the ISO/IEC17024 standard. The model for this arrangement is shown in Figure 1. The Certification Body is currently CATG, and the Scheme Owner is currently The Drinking Water Inspectorate.

Figure 1 BS EN ISO/IEC 17024 model

Refer to BS EN ISO/IEC 17024:2012 Certification of Persons Scheme for sampling private water supplies in accordance with the Private Water Supply Regulations.



The procedures contained within this manual prescribe the standard sampling arrangements and methods which local authorities and their contracted representatives must follow for the purpose of regulatory monitoring of private water supplies.

Whilst procedures for the application of field-site testing equipment and investigational sampling are covered in this manual for the purpose of guidance, demonstration of competency in these areas is not a requirement of the BS EN ISO/IEC 17024 scheme. This additional information is included in Appendices for guidance only. The word “sampler” is used in this manual as a generic term. It applies to any person employed by a local authority or their contractor, for example a water sampling company, trained under the BS EN ISO/IEC 17024 scheme, to collect water samples. This includes, for example, Environmental Health Officers, Technical Officers and persons contracted exclusively for sampling.

To differentiate between local manual adaptations, the standard manual within the scheme shall be known as the “scheme manual”. The appendices of each local manual must each contain the following with any local adaptations, where stated:

1. Sample bottles

It is recognised that bottle types may vary according to suppliers. Accordingly, each sampler shall include within their version of the manual a comprehensive photographic list of all bottle types used by the authority or sampling company they are employed by. This must be appended to the manual.

2. Sampling methods

Each sampler shall amend/replace any methods for the taking of samples in section 8 of this manual, in accordance with its laboratory/supplier’s instructions. All amendments and adaptations to a manual as per the above requirements, and as defined in the scope of this document, shall be incorporated into the manual.

3. Equipment

A list of all local sampling equipment shall be appended to the manual.

4. Authorisation to sample

A copy of, or a localised version of, the “Authorisation to carry out sampling” proforma, which must provide the same information as that shown in the scheme manual shall be appended to the manual.

5. Sample chain of custody form

The chain of custody form is a document that accompanies samples during their transportation from the sampling location until they are signed over to the laboratory. This is sometimes known as a laboratory submission form. A copy of, or a localised version of the “Chain of Custody record” proforma, must provide the same information as that shown in the scheme manual, which must be appended in the local manual.

6. Sample storage

A copy of, or a localised version of, the “Sample storage temperature record and cleaning” proforma, which must provide the same information as that shown in the scheme manual shall be appended to the manual.

All amendments and adaptations to a sampler’s manual as per the above requirements, and as defined in the scope of this document shall be incorporated into the manual prior to each prospective sampler’s application for assessment and certification. This amended version of the manual shall be presented to the certification body and assessed as part of the applicant’s assessment. This shall be accompanied by a written statement from the laboratory confirming that this complies with the analytical method accredited under BS EN ISO/IEC 17025.

7. Health and safety

Only the minimum health and safety requirements that are specific to certain procedures have been included in the scheme manual. Samplers may incorporate any additional local health and safety requirements in accordance with local policies and procedures, as they see fit. Health and safety information is not part of the accredited methodology but may be included in the local manual.

8. Investigational sampling

Accredited methodology for the collection of investigational samples falls outside of the scope of this scheme. However, by following the procedures in this manual a sampler is following good sampling practice to a common standard.

Additional advice for sampling from other points for the purposes of undertaking investigations, for example, at open water, can be found in Appendix B.

9. Document control

The administration of this document and the methods and procedures contained therein are maintained using a quality managed system. This is to ensure that the standard of sampling and on-site testing of private water supplies complies with the Drinking Water Test Specification (DWTS). Each holder of the manual shall complete the Version control record (Table 1).

Table 1: Version control record (internal use only)

Manual holder's name	Version number of manual	Date version issued	Date manual implemented	Date version revoked

Scheme Manual and Local Manual Definition

- Scheme Manual – This refers to the latest version of this document.
- Local Manual – a version of the current Scheme Manual that has additional appendices describing sample bottles, sample methods, equipment, and other forms where these differ from those described in the Scheme Manual.

10. Scope of Document

This Scheme Manual covers the requirements for taking, transporting and storage of samples for regulatory monitoring purposes.

In addition, this manual contains appendices which provide additional information on best practice for other activities, including for field testing and non-regulatory sampling. The appendices do not form part of the scope for, or assessment of this scheme, and are provided for guidance/best practice only.

11. Changes and anomalies

Users of this manual are encouraged to submit any suggested changes or query any aspect of the manual by the submission of a “Change request form” (See Appendix A8), by email to the scheme owner for consideration of its inclusion, at each three yearly review of the manual.

12. Personal protective equipment (PPE)

Eye protection, suitably protective gloves, and appropriate work-wear such as coveralls, work trousers and long sleeved tops need to be worn at all times when mixing and applying the chlorine disinfectant solution. At NO time is bare skin to be exposed to the chlorine disinfectant solution.

This PPE is in addition to any other PPE specified in local arrangements. All other applicable local health and safety measures must be observed.

Section 1 – Training and competency

1.1 Competency

A sampler shall be deemed competent to take samples of private water supplies when they have demonstrated compliance with the procedures laid down in this manual to the satisfaction of the certification body named and designated in the scheme. Those individuals deemed competent to sample by the certification body, shall be awarded an authorised certificate. The certification body shall be accredited by UKAS by demonstration of its compliance with BS EN ISO/IEC 17024. UKAS will assess the certification body on an annual basis to determine ongoing compliance with the BS EN ISO/IEC 17024 standard.

Ongoing local competency of samplers shall be demonstrated by the audit process prescribed in the BS EN ISO/IEC 17024 scheme at the frequency specified.

Where ongoing competency of a sampler is not evident, the certification body will suspend or withdraw that individual's sampling certificate until their competency can be demonstrated.

A local authority or sampling service company acting on behalf of a local authority may suspend any sampler if malpractice is uncovered, according to their own disciplinary procedures and when so doing, must inform the certifying body who will decide if any sampling accreditation is withdrawn.

1.2 Training

1.1.1 Introduction

The training of samplers to meet the competency requirements of the scheme may be carried out by the certification body, as described in BS EN ISO/IEC 17024 scheme requirements or by an independent training provider. If training is delivered by a certification body, then they must demonstrate independence between training and examination.

1.1.2 Induction

Any managers responsible for samplers shall provide all certified samplers with the tools, equipment, and personal protective equipment (PPE) required for sampling in accordance with the procedures in this manual. A list of this equipment, including the make, model and serial numbers of all test equipment shall be appended to the local manual. This equipment shall include a current and numbered copy of the sampling procedures manual that has been amended in accordance with the instructions 1-6 within the Scope of this manual. The designated technical manager must complete an "Authorisation to carry out sampling record" (See Appendix A8) once they are satisfied that the sampler has an BS EN ISO/IEC 17024 certificate of competency.

Section 2 – Maintaining sample integrity

Samples must remain refrigerated, including when they are in transit and being stored. These must be transported upright within a temperature range of 2-8 °C in either a cool box or refrigerated unit on the vehicle. See section 9 for further details. Samples must always be protected from direct sunlight as much as possible.

Samplers shall always wear appropriate PPE to meet the relevant health and safety risks at the time of sampling. Each sampling activity shall be subject to the application of all health and safety requirements laid down by the local authority, or the sampler's employer.

Never eat, smoke or drink whilst sampling. Hands must always be washed between taking each set of samples.

Section 3 – Sample type

Samples from private water supplies are taken for one of two reasons shown below:

- a) **Samples taken for the purposes of regulation 7 of the Regulations.** These must be taken at a tap that is representative of the supply, typically at the point of consumption. If the water is used in food production, it must be taken at the point at which it is used in the undertaking. If the water is supplied from a tanker, it is the point at which it emerges from the tanker. The sample parameters, collection frequencies, and points of collection are prescribed by the Regulations.
- b) **Those samples taken for investigational purposes (regulation 16, or 18 in Wales).** Investigational samples may be taken to help establish the cause where it is suspected that a supply is unwholesome or there is a potential danger to human health. They are also taken to verify that any remedial action has been effective. **The sampling of investigational samples is not within the scope of the accreditation of this manual. However, it is recommended that sampling by the procedures described in the scheme for those investigational purposes should be followed as good practice.**

Sample types can also be designated according to the order in which they are collected (pre-flush, post flush etc.). This sequence, the order of sampling, is an essential element of sampling procedures.

Section 4 – Bottle type

The analytical test requirements for any given sample will determine the bottle type. Sample vessels (usually termed generically as bottles) vary in shape, size, volume, and the material from which they are made from. This includes: the level of their transparency, how they are pre-prepared (in some cases additives/preservatives are added), whether they are reusable, and in their cap type and colour. The vessel used must be of the appropriate type for the intended tests. The bottle type required for a particular test or set of tests influences the method and sampling technique to be applied.

Bottles used for the sampling and analysis of private water supplies must, under the BS EN ISO/IEC 17024 scheme, only be those supplied by the laboratory service provider. Analysis of samples must be carried out in accordance with the Drinking Water Testing Specification and accredited to BS EN ISO/IEC 17025 by UKAS.

A copy of the sampler's analytical provider's current bottle list must be appended to the local manual and referenced where relevant in relation to its use.

Where relevant, each bottle shall be labelled with an expiry date (use-by) and if necessary, with appropriate hazard labels **(this is added by the bottle provider before it is issued for use)**. A designated Officer must assign specific individuals to the responsibility of the management of sampling equipment, sample bottles and their hygienic and secure storage. They should ensure any relevant health and safety measures are applied. Bottles must be stored in a clean dry environment, and locally stored stocks must be managed such that out-of-date bottles are not used accidentally. Any out-of-date sample bottles must be returned to the appropriate bottle provider.

Where vessels have tamper-proof seals on the lids, these must be checked prior to use to ensure they are undamaged. If they are damaged, they must be discarded and returned to the provider.

Section 5 - Preparation of tap disinfectant solution

Appropriate health and safety procedures need to be employed when using hypochlorite (or chlorine) solutions. It is recommended that samplers undertake a risk assessment for using these chemicals and reference the manufacturer's hazard and data sheets or "Control of Substances Hazardous to Health" (COSHH) sheets as part of the risk assessment. Even at low concentrations chlorinated water can kill fish and cause environmental pollution, if discharged to a watercourse. It is therefore essential to plan how best to dispose of chlorinated solutions to the environment. For example, diluted and discharged to the foul sewer via a sink or toilet).

- a) Commercial hypochlorite (sodium) solution is a caustic solution containing between 10% and 15% available chlorine when new. Appropriate health and safety measures must be put in place for its storage and handling.
- b) Chlorine tablets are rapidly dissolving and when used in a known volume of water, provide a simple and effective means of preparing chlorine solutions of known strength for disinfection purposes approved for use with wholesome water. These are best used for making up small quantities of solution.

The chlorine solution must be prepared to the concentration of 10,000 mg/L on the day of sampling, prior to the sampling visit(s). This must be made to this concentration using rapid release tablets or liquid sodium hypochlorite. When using 'rapid release' chlorine tablets it is necessary to consider the different types/sizes of tablet available on the market, and the strength of solution that will be produced. Reference should be made to the manufacturer's instructions/guidance notes. Pre-prepared proprietary solutions must not be used. All local and manufacturers' health and safety precautions must be applied during the preparation of the solution.

Whether tablet or liquid, one of the following compounds must be used to make the solution. This must meet the respective BS EN standard for use for treatment of water for human consumption as shown in the table below:

Chemical	Standard
Sodium hypochlorite	BS EN 901:2024
Calcium hypochlorite	BS EN 900:2014
Sodium dichroisyanurate	BS EN 12931

The date, description and concentration of the solution must be clearly displayed on the container together with any hazard labels. Instruction for preparation of this solution must be included in the sampling procedures, including the make/type/size/concentration of product used.

Any excess solution that remains after all sampling has been completed must be suitably disposed of that day. These solutions cannot be allowed to enter watercourses or surface water drains to comply with control of pollution environmental legislation. Disposal of this must therefore be to a public foul sewer. This method of disposal is not suitable for use where septic tanks or cesspits are in use. In these situations, it is recommended that tank manufacturers' instructions are followed.

Section 6 – Order of sampling

Sampling in the correct order is an essential requirement of sampling methodology. This ensures that samples are representative. The first bottle to be filled in the sampling sequence shall be determined by the analytical requirements of the sample. This can comprise a collection of different sample bottle types for a range of analysis. These shall be collected in accordance with the methods shown in section 7.

Sample bottles must be labelled in advance of each sampling visit to avoid inadvertent mislabeling during sample collection. The correct order of sampling steps is as follows:

1. Initial checks
2. Plumbing metals sample
3. Preparation of the tap
4. [On site tests, where relevant*]
5. After flush chemistry samples
6. Disinfection of the tap
7. Microbiological samples

* Where the water is chlorinated, it is recommended that chlorine residual readings be taken at this point. Other on-site tests may be carried out for **the purposes of good practise** at point 4 above. These include temperature, taste, odour, and appearance.

These on-site tests provide quick and easy checks of the aesthetic quality of the water which can give indications that the water may be unwholesome, for example, in terms of its acceptability to consumers. If this is the case, the cause of any supply that is suspected of being unwholesome must be investigated in accordance with regulation 16 (18 in Wales).

It is not however a requirement for samplers to demonstrate competency in on-site testing as part of the BS EN ISO/IEC 17024 scheme.

Section 7 – Sampling methods

The sampling methods in this section are described in the order they must be taken.

Failure to follow the correct procedure and the sampling methods prescribed in the manual could result in samples being unrepresentative of the supply and result in unnecessary investigations and remedial work. It is essential when taking samples in accordance with this section of the manual, that the bottle types used are appropriate to the parameters being tested, as specified by the laboratory service provider.

All procedures must be carried out only by samplers certified under the accredited sampling scheme.

Samples must be collected from a suitably representative tap supplying water used for human consumption or, as relevant, at the point at which it is used in any food production undertaking.

Where samples are taken at regular intervals, for investigational purposes (notably for lead), the times must be measured using a suitable digital instrument, for example, a stopwatch. Time durations must not be estimated.

7.1 Initial checks

- Ensure that the correct property is being sampled, as well as the correct location within the property.
- Ensure that the tap type and condition is likely to provide a sample that is representative of the supply. Record any observations where representativeness might be compromised, for example, unhygienic surroundings, tap hoses and attachments/anti-splash devices in use.
- Check for, and make a note of, any in-line filters, point of use devices or softeners before sampling.

7.2 Plumbing metals (lead, copper, nickel)

The Regulations require that these parameters are analysed from a **one litre volume “random daytime sample.”** This means that the sample must represent the first 1 litre of water that is run from the tap before any cleaning or flushing of it, and prior to any other samples being taken from it. It can be taken at any time within a 24-hour period, ensuring that the bottle is not first rinsed.

The sampling steps are as follows:

Prior to taking the sample, clean hands with antibacterial hand gel/hand wipes and consider wearing disposable single use hygienic gloves.

- Do NOT rinse the bottle.

- Fill the bottle by holding it under the water stream at a slight angle.
- Avoid splashing and fill as required by the laboratory bottle guide.
- Replace the cap taking care not to touch the inside of the cap or for it to come into contact with anything.
- Tighten the cap.
- Transfer to and transport in a refrigerated unit or cool box.

Where a timed investigational stagnation sample for plumbing metals is being taken for investigation purposes, it should be collected in the manner shown in Appendix B.5.

7.3 Tap preparation

Clean the outside of the tap with 70% isopropyl alcohol wipe to remove any debris, grease or other potential sample contaminants. *Note: this does not constitute disinfection of the tap. See section 8.1 for instructions on tap disinfection.*

- Remove anti-splash devices or rubber hoses etc. where practicable and with the permission of the premises owner or their representative.
- Turn the tap on and adjust the flow. Run for a minimum of two minutes.
- Where the supply is chlorinated, take an on-site test measurement at the start and at the end of sampling to verify that the concentration has not changed.

7.4 Chemistry

This section contains the procedures for the taking of samples for all Regulatory Group A and Group B chemistry parameters. Group B parameters are the parameters listed in Parts 1 and 2 (of schedule 1 of the Regulations).

The sampler must add the sampling procedures for each of these parameters into their local sampling manual as part of their certification. Bottles for chemical analysis must be filled in accordance with the instruction of the accredited analytical laboratory. They must be the methods of the accredited laboratory performing the analysis to ensure that sample collection and transport is consistent with the accredited analytical method.

Include sampling procedures for the following parameters:

- Metals other than mercury and plumbing metals

- Pesticides
- Trihalomethanes (THMS)
- Polyaromatic hydrocarbons (PAH)
- Mercury and alpha and beta samples
- Sulphide
- General chemistry parameters
- Radon
- Taste and odour

Section 8 – Microbiological sampling

Following tap preparation and all relevant chemistry samples, turn off the tap and carry out the following procedures using a 10000 mg/l chlorine solution:

8.1 Disinfection of tap

N.B. For purposes of best practice this method employs a double disinfection procedure:

- Following flush and completion of any chemical sampling turn tap off.
- Inject a pre-prepared chlorine solution (see section 5) over and into the tap nozzle using a suitable container product (for example, a laboratory-style wash bottle). Leave the solution for a contact time of two minutes. **(the make and model of the vessel or container used must be listed in the appended equipment list).**
- Turn on the tap and adjust the flow to a steady stream.
- Run for one minute, then turn off the tap.
- Re-apply the disinfectant and leave for a minimum of two minutes.
- Turn on the tap and adjust flow to steady stream.
- Run the tap for a minimum of two minutes.

8.2 Microbiological sampling procedure

(Using a pre-prepared 500 ml sterilised clear plastic bottle with added sodium thiosulphate):

- Clean hands with antibacterial hand gel/hand wipes. Consider wearing disposable single use hygienic gloves.
- Using the bacterial bottle type shown in the appendix of this manual,

hold it near its base and unscrew cap.

- Do not put the cap down. Hold it open end downwards.
- Do NOT rinse the bottle.
- Fill the bottle by holding it under the water stream a slight angle.
- Avoid splashing and fill to the line where the cap meets the bottle so as to leave an air space to allow for expansion during transportation.
- Replace the cap taking care not to touch the inside of the cap or it to come into contact with anything.
- Tighten the cap and invert.
- Transfer to and transport in a refrigerated unit or cool box.

Section 9 – Storage and transportation of samples

Samples must be transferred to a vehicle fridge, refrigerated vehicle or cool box, which must be maintained at 2-8°C after being taken, until delivery to the laboratory. The analytical laboratory can advise on any other bottles requiring refrigeration. Where cool boxes are used, enough frozen ice packs must be placed within the cool box during the transportation of samples to ensure the temperature remains within the required temperature range.

Complete the “Chain of custody record” using the sampler’s local proforma, a copy of which must be appended to the samples, for each crate of sample bottles to be transferred to the laboratory and place it into the crate. The sampler may retain a copy for their own record.

Where samples are transferred to a third party, for example, a courier, ferry captain or a pilot, crates must be sealed to prevent any tampering of samples during transit.

Samples must always remain upright whilst in transit. Raw (untreated) water investigational samples and samples from the tap taken for regulatory purposes must be segregated to prevent contamination. The temperature of fridges and cool boxes used for transporting samples must remain stable and within 2°C and 8°C during their transportation. This must be monitored using a data logger and the data downloaded on a daily basis and checked to ensure the temperature has been maintained between the correct range.

Short-lived variations below 2°C and above 8°C are to be expected as the fridge/cool box is opened. Occasions lasting over one hour should be noted.

The microbiological characteristics of a sample can change significantly when stored, even for relatively short periods of time.

The samples must be transferred to the laboratory as soon as practicable on the day of collection, for analysis to commence promptly on arrival - ideally within 24 hours, whilst taking account of parameter stability times.

If samples are unable to be received by the laboratory on the day of sampling, they must be stored upright and securely in a secure fridge at 2-8°C and transported to the laboratory the following morning for prompt analysis, ideally within eight hours.

Any recordings outside of the range 2-8°C should be notified to the laboratory quality control manager, so that corrective action can be taken.

Where samples are transported to the laboratory by a third party (for example, a courier) the temperature of the fridge in the vehicle, and any fridge where the samples have been transferred and stored prior to their transportation to the laboratory, must be recorded on a record sheet.

An example of a record sheet can be found in Appendix A8. Arrangements must be made for the courier to deliver the samples to the laboratory, as soon as is practicable.

Cool boxes must be cleaned using a suitable commercial disinfectant product prior to the sampling visit, either on the day or evening before.

Appendices

These appendices are intended to provide guidance on current best practice and to assist with investigations or other types of sampling.

Appendix A

A1. On site testing

It is not a requirement under BS EN ISO/IEC 17024 scheme to demonstrate competency in the following procedures. These are provided for guidance only.

Note, it is recommended that all instrumentation used for on-site testing is regularly calibrated (see Appendices A2 and A7).

A2. Procedure for temperature readings

Where water temperature readings are taken for reasons of good practice or as part of an investigation, they must be taken using a suitable thermometer, according to the manufacturer's instructions. These may vary according to the make and model. The thermometer should have a range between 0°C and 100°C and be capable of reading to within 0.1°C over the range of use.

All digital thermometers must be calibrated as per manufacturer's instructions before they are used. Thereafter, they shall be calibrated according to manufacturer's instructions every 12 months. This must be in accordance with the appropriate British Standard. Calibration shall consist of measuring temperature in an ice bath, and in boiling water. Thermometers that do not read 0°C and 100°C respectively shall be replaced with a new thermometer.

- Take any pre-flush temperature readings for any investigational sampling required.
- Flush the tap for a minimum of three minutes.
- Place a beaker under the tap and run water into it until it overflows.
- Turn on the thermometer and immerse only the probe into the water in the beaker.
- Allow the temperature to stabilise then record the thermometer reading as shown on the unit.
- If the temperature recorded appears abnormally high or low, then repeat the check and record the temperature once it has stabilised.
- Where the temperature remains abnormally high, an investigation must be carried out to determine the cause and extent. Following this the local authority will need to ensure that one or more relevant person (as defined in

section 80 of The Water Industry Act 1991) carries out the necessary remedial action to prevent a recurrence and subsequently verifies completion in a timely manner.

A3. Chlorine residual measurements

The measurement of chlorine residual is only applicable where the supply is known or suspected to be disinfected or pre-treated with a chlorine disinfectant, such as sodium hypochlorite.

Methods will vary according to the instructions of the device and manufacturer's model. The manufacturer's instructions must be followed in all cases. The sampler must insert the procedures for the instrument used in accordance with the manufacturer's instructions into this document.

A3.1 NN-Diethyl-p-phenylenediamine (DPD) reagents (DPD)

DPD measures chlorine that is not bound chemically to other compounds ("free" chlorine). The addition of DPD to chlorinated water forms a pink/red colour, which is measurable.

To measure "total" chlorine (free chlorine and chlorine which has become chemically bound to other components, known as "combined" chlorine), the DPD is used with iodide, which reacts with DPD to give a measurable pink/red colour, proportional to the total chlorine concentration.

If stored in a clean dry environment liquid DPD has a shelf life of twelve months whilst unopened and one month when opened. The reagent container must be refrigerated once opened. The expiry date of one month from the date of opening must be written on every bottle where it is used, once it has been opened. Discard any liquid DPD bottles which are outside this date. Check that the DPD reagents in use have a legible batch number and expiry date by the manufacturer. Discard any bottles where the batch number or expiry date is illegible.

After flushing the tap for three minutes, carry out the following procedures as required.

A4. Visual appearance

Vessel types for this test may vary and the method should be checked by the laboratory supplier. The procedure must be amended locally as required.

- Take an untreated 1 L taste and odour bottle and rinse the bottle and stopper under the tap twice.
- By holding under a running tap, half fill the taste and odour bottle and replace the stopper.
- Invert the bottle and shake vigorously.

- Hold the bottle up to the light and inspect the contents for any particulates, turbidity/cloudiness or colour.
- Note the appearance of the water.
- Record the results of your observations.

A5. Procedure for field odour test

- After completing the visual test remove the stopper and immediately smell the sample.
- Note and record any abnormal odour or absence of odour.
- Discard the sample unless carrying out a taste test.

If an unusual odour is detected; caution must be applied when proceeding to tasting the water.

A6. Procedure for taste test (optional)

- Pour a small portion of the original odour sample into a beaker and rinse.
- Discard the water in the beaker.
- Pour approximately 125 ml of the original odour sample into the beaker. Taste the sample.
- Note and record any abnormal taste, or absence of taste.

A7. Test equipment checks

Test equipment must be checked and calibrated in accordance with manufacturer's instructions to ensure the equipment remains fit for purpose.

A8. Proformas

The following proformas must be appended to the local authority version of the scheme manual. These may be adapted locally but must contain the same information as those in the example proformas embed below.

- Manual change request form
- Chain of custody form
- Authorisation to carry out sampling
- Daily check for vehicle and refrigerated storage
- Sample storage fridge temperature and cleaning record
- Sample bottle image list and their descriptions (sampler to add their own list)
- Sampler's local equipment list (sampler to add their own list)

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Request Form

Sampler contact name:

Sampler contact email and phone number:

Section of manual that the change refers to (including page number):

Reason for the requested change:

Further details of the requested change to be described below:

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Sample Chain of Custody record

Each crate must be accompanied by only one of these sheets. It must be completed at two stages to form a record of the sample handling process from the time at which the crate is sealed at the courier point to when it is unsealed and the samples received at the laboratory.

Crate identity number:

TO BE COMPLETED ON FILLING THE CRATE

Courier point location..... Name of
 person loading crate..... Local
 authority/organisation name..... Contact
 phone number of above..... Signature of
 person loading the crate..... Time crate
 sealed..... Date crate
 sealed..... No of
 microbiology samples in crate

No. Chemistry bottle in crate.....

No. of other bottles in crate.....

TOTAL No. BOTTLES.....

On the reverse of this sheet write the identification numbers of the samples placed in the crate accompanied by this sheet (or stick on labels with the identification numbers).

2. TO BE COMPLETED ON ARRIVAL AT LABORATORY

Date samples arrived at sample reception.....

Time samples arrived at sample reception.....

Name of laboratory.....

Samples registered by (insert
name).....

*I confirm that [] bottles (insert total no.) have been received, and that the sample
identification numbers correspond to those on the reverse of this sheet.*

No. bottles broken or missing.....

Signature of the above named

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AUTHORISATION TO CARRY OUT SAMPLING	
Name of sampler	
Post	
Date of Appointment	
Present location and date	
Date of training	
Date of assessment by Certification Body	
Sample procedures manual number and issue date	
<p>Technical Manager Declaration</p> <p>I confirm this person has undergone a full training/ review/ audit (delete as appropriate) and I authorise this person to carry out the statutory and or operational/commercial sampling on behalf of the local authority. I also confirm that I have provided the tools, equipment and PPE required for sampling in accordance with the procedures in this manual</p> <p>Technical Manager signature and date</p>	

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Daily check for vehicle and refrigerated storage	
Vehicle type/registration	
Fridge/cool box Serial/Equipment No.	
Thermometer serial no./type	

Note	This is only to be filled in on days when a cool box is being used. On days when this is not being used record "n/a" against the date. A min/max thermometer must be used and min/max temperatures reset at the start of the day and recorded at the end of the sample round.
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Month:

Year:

Required range: 2-8°C

Date	Fridge/cool box cleaned	Initial	Min temperature	Max temperature	Initial	Comments
1 st						
2 nd						
3 rd						
4 th						
5 th						
6 th						
7 th						
8 th						
9 th						
10 th						
11 th						
12 th						
13 th						
14 th						
15 th						

16 th						
17 th						
18 th						
19 th						
20 th						
21 st						
22 nd						
23 rd						
24 th						
25 th						
26 th						
27 th						
28 th						
29 th						
30 th						
31 st						

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Sample storage fridge temperature and cleaning record									
Site									
Month					Year				
Thermometer Type/No.					Fridge type/ no.				
Thermometer working range		2-8°C							
Date	Start Time	Start Temp °C	Fridge/storage (cleaned/not cleaned)	Initial	End Time	Maximum and minimum temp °C	Temp in range to 8°C? (Y/N)	Initial	
1 st									
2 nd									
3 rd									
4 th									
5 th									
6 th									
7 th									
8 th									
9 th									

10 th									
11 th									
12 th									
13 th									
14 th									
15 th									
16 th									
17 th									
18 th									
19 th									
20 th									
21 st									
22 nd									
23 rd									
24 th									
25 th									
26 th									
27 th									
28 th									
29 th									
30 th									
31 st									

On days where fridge/storage is not used start/end times must be recorded as "n/a"

<u>Comments</u>	
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The following proformas are provided as examples only. It is not a requirement of the BS EN ISO/IEC 17024 scheme that these are appended to the local authority version of the scheme manual:

- Calibration record for hand held Chlorometer.
- Daily check for hand held Chlorometer.
- Calibration record for field thermometer.
- Calibration record for reference thermometer.
- Daily check for hand held instrumentation.
- Calibration record for primary thermometer.

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Calibration record for hand held Chlorometer			
Instrument name (in full):			
Meter Serial/Equipment No.			
Date of Calibration:			
Reason for Calibration			
Calibration Standard type and batch no.			
1 st standard value (low)			
2 nd standard value (medium)		Recorded value on instrument	
3 rd standard value (high)		Recorded value on instrument	
Calibration successful? Y/N		Recorded value on instrument	
Checked against standard			
Comments:		Within acceptable range? Y/N	
Date of Calibration:			
Reason for Calibration			
Calibration Standard type and batch no.			
1 st standard value (low)			
2 nd standard value (medium)			
3 rd standard value (high)		Recorded value on instrument	
Calibration successful? Y/N		Recorded value on instrument	
Checked against standard		Recorded value on instrument	
Comments:			

		Within acceptable range? Y/N	
Date of Calibration:			
Reason for Calibration			
Calibration Standard type and batch no.			
1 st standard value (low)			
2 nd standard value (medium)		Recorded value on instrument	
3 rd standard value (high)		Recorded value on instrument	
Calibration successful? Y/N		Recorded value on instrument	
Checked against standard			
Comments:		Within acceptable range? Y/N	
<p>Note: Instruments must be calibrated according to manufacturer's instructions</p>			

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Daily check for hand held Chlorometer

Instrument name (in full):	
Meter Serial/Equipment No.	
Standard used	
Batch number	
Target value, limits and units	
Date of last calibration	
Date of next calibration	

Date	Instrument reading	Within Acceptable Range? (Yes/No)	Initial	Comments	Date	Instrument reading	Within Acceptable Range? (Yes/No)	Initial	Comments
1 st					17 th				
2 nd					18 th				
3 rd					19 th				
4 th					20 th				
5 th					21 st				
6 th					22 nd				
7 th					23 rd				
8 th					24 th				
9 th					25 th				
10 th					26 th				
11 th					27 th				
12 th					28 th				
13 th					29 th				
14 th					30 th				
15 th					31 st				
16 th									

Note: This is only to be filled in on days when instrument is used. On days when not being used record "n/a" against date. Manufacturer's instructions for calibration must be followed.

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Calibration record for reference thermometer		
Reference Thermometer		
Type and serial No.		
Frequency of calibration		
Required tolerance		
Date of calibration	Calibrated by	Comments (including whether the required tolerance was met)
<p>Note: It is expected that the reference thermometer will be sent for external calibration by an accredited calibration laboratory and used as a reference to calibrate thermometers used in the field.</p>		

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Daily check for hand held instrumentation

Instrument name (in full):	
Meter Serial/Equipment No.	
Standard used	
Batch number	
Standard measurement and unit	
Date of last calibration	
Date of next calibration	

Date	Instrument reading	Within acceptable range? (Yes/No)	Initial	Comments	Date	Instrument reading	Within acceptable range? (Yes/No)	Initial	Comments
1 st					17 th				
2 nd					18 th				
3 rd					19 th				
4 th					20 th				
5 th					21 st				
6 th					22 nd				
7 th					23 rd				
8 th					24 th				
9 th					25 th				
10 th					26 th				
11 th					27 th				
12 th					28 th				
13 th					29 th				
14 th					30 th				
15 th					31 st				
16 th									

Note: This is only to be filled in on days when instrument is used. On days when not being used record "n/a" against date. Manufacturer's instructions for calibration must be followed.

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Appendix B

The sampling information and procedures in this section are not part of the BS EN ISO/IEC 17024 accredited scheme. They are provided here for the purpose of assisting samplers in the collection of samples for investigatory purposes.

Regulation 16 in England and regulation 18 in Wales, of the respective regulations, require that a local authority must carry out an investigation to establish the cause if it suspects that a private water supply is unwholesome or that an indicator parameter does not comply with the concentrations or values prescribed in the relevant schedules. Such investigations may include sampling at points on a supply other than the point of consumption and/or for parameters that are additional to those that have breached a regulatory standard.

Investigational sample types – As shown in section A of this manual, regulatory samples, with the exception of those for plumbing metals, must be taken following the preparation of the tap, either prior to flushing (for plumbing metals) or after flushing, and in the case of microbiological samples, after disinfecting the tap. For the purposes of investigations however, the following other sample types can be used:

- (a) **Overnight stagnation samples** – These samples give a measure of the potential conditions for the dissolution of metals or microbiological growth within plumbing systems, after an overnight period in which the water could have remained static in pipework. Ideally these samples are taken prior to any consumer use, and before any preparative flushing, cleansing or disinfection of the tap as part of an investigation. The sample bottle must not be rinsed out before filling.
- (b) **Pre-flush samples** – These sample types are taken prior to any flushing, cleansing or disinfection of a tap at a random point in any 24 hour period. Microbiological samples of this type may also be accompanied by a swab to determine biofilm/growth within fittings. In these instances, the swab must be taken before cleaning/cleansing the tap and the taking of any other samples.

Swabs need to be moistened to effectively pick up material and to maintain viability of organisms. Usually the tap has some residual water from its last use, if not, it can be opened just enough to wet the end of the tap.

Pre-flush chemistry samples may also be useful in certain circumstances, notably for investigating or confirming the occurrence of plumbing metals on a domestic distribution system, such as lead, copper, nickel or indeed iron. The results of these samples can be compared with post flush samples (either

regulatory or investigational) for the same parameters. Post flush samples for chemical analysis must be taken prior to microbiological samples.

- (c) **Lead stagnation samples** – samples of this type may be collected for investigative purposes to measure the lead content in water after it has been static in lead pipework for a defined period. (See Appendix B.2 for procedure).

B.1. Procedure for sampling raw water from an open water source

This procedure is applicable for taking investigational samples from any open water facility. This includes rivers and streams, chambers, channels and storage reservoirs (and tanks) where sampling can only be achieved by standing over open water from a height. Samplers must recognize when undertaking microbiological sampling that this method poses contamination risks and health and safety hazards.

When sampling at height, all appropriate local health and safety procedures must be adhered to. Single use disposable gloves must be worn when taking microbiological samples (for example, large volume samples). Where there is a risk of falling into open water, always wear a life jacket.

- When working from height, direct filling of sample bottles, other than samples for pathogens and viruses is not advised. It requires the use of a dipping jug on a chain.
- First find a suitably safe place to take the sample without causing risk of injury. This may be a bridge, platform or jetty.
- Check that the jug is clean, dry and not contaminated.
- Lower the jug and allow it to sink well below the surface. Do not allow the jug to hit the bottom surface to avoid disturbance of any sediment or biofilm, etc.
- Draw the jug back. Rinse water around the inner surfaces of the jug and discard the water away from or downstream from the sample point.
- Lower jug as before and draw jug back.
- Fill sample bottles without delay by pouring from the jug, observing any specific requirements of the bottle type. Any rinsing should be disposed away from, or downstream of the sample point.

B.2. Procedure for lead stagnation sampling

Lead stagnation samples represent the concentration of lead in the sample after the water has been left in contact with pipes for a specified duration (for example, 30 minutes). This is to assist with determining the level of risk posed by plumbing and any lead pipes and/or fittings.

These samples must be collected at point 2 in the order of sampling shown in section 6 using a plastic bottle that is at least 1 L in volume.

- Explain to consumer that they will be unable to use the tap for a specified period due to stagnation method.
- The tap must be first flushed for a minimum of two minutes and the temperature checked throughout flushing.
- When the temperature has stabilised turn off the tap.
- Do not turn on the tap for 30 minutes.
- Collect the first litre of water without first rinsing the bottle and then screw on the cap.
- Transfer to and transport in a refrigerated unit or cool box.