

**Private Water Supplies Sampling Manual**

**A Field Guide**

## Foreword

This sampling manual details standard procedures for the collection, storage and transportation of samples at private water supplies in accordance with current guidance (see **Section 8**).

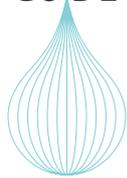
As well as sampling procedures it also highlights the necessary safety precautions which should be observed in the handling of chemicals, and facilitates the inclusion, within appendices, of manufacturers' instructions to undertake on-site measurements; validation documents for instrumentation; and material safety data sheets.

This field guide is specifically for use by Environmental Health staff engaged in taking water quality samples from private water supplies and is intended to support any sampling procedures already in place.

The manual is reproduced from a guide published by the Drinking Water Inspectorate for Northern Ireland (ISBN 978-1-907053-11-5), and has been agreed between the UK Drinking Water Regulators. It is designed to be printed in an A5 format.

# Private Water Supplies Sampling Manual

## A FIELD GUIDE



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# 1. General Sampling Procedures

## Sample Point

- 1.1 A sample point should be post any treatment and representative of the water at point of use.  
*[Note: All sample points should be predetermined and given a unique identifier at the time of registration or risk assessment of a private supply; it is important that this identifier is used consistently.]*
- 1.2 Remove any attachments (e.g. hoses) or plastic inserts where fitted to the tap which could contaminate the sample. Any issues with the sample point which may affect the sterilisation of the tap or the sample results should be noted on the field sheet.

## Chemical Sampling

- 1.3 If a sample is to be taken for first draw metal analysis (**lead, copper and nickel**) this sample bottle must be filled before the flushing step below (i.e. first issuance). This may be noted on the field sheet and bottle label. Adjust the flow to ensure a gentle and steady stream of water into the bottle.
- 1.4 The tap must then be flushed for at least 2 mins to remove any standing water within the pipe work before other chemical samples are taken. (flush time should be extended for longer service pipes).
- 1.5 If the private water supply has disinfection in place through chlorination or chlorine dioxide then a residual should be measured (see **Section 5** or **6**).
- 1.6 Fill the **chemical sample bottles**, following closely any instructions in **Appendix B**, or on the labels of the bottles, and observing any expiry dates.

## **Bacteriological Sampling**

- 1.7 If no chemical samples are required, the tap must be flushed for at least 2 minutes (extend flush time for larger service pipes) and, where disinfection by chlorination or chlorine dioxide is in use, then a residual should be measured (see **Section 5** or **6**).
- 1.8 If the tap is metal with no plastic inserts and is located outdoors or in an open location, the tap may be flamed (see **Section 2**) where it is safe to do so.
- 1.9 Where a tap may be damaged by flaming or where it is unsafe to flame the tap, sterilisation of the tap may be carried out by use of a chlorine solution (see **Section 3**).
- 1.10 After sterilisation, bacteriological samples should be taken in sterile bottles. Checks should be made that the expiry date is satisfactory and that the sterile seal has not been broken.
- 1.11 Care should be taken in bacteriological sampling; remove the top and hold with the open end downwards; the top should not be placed down on any surface.
- 1.12 Place the bottle into a steady stream of water, ensuring it does not touch the tap, and fill to the base of the neck. The bottle should not be rinsed out or be allowed to overflow. A small air gap must be left at the top of the bottle.
- 1.13 If in taking the sample it is suspected the sample has been contaminated, the sample and the bottle should be discarded and the procedure restarted.

## **Record Keeping**

- 1.14 Field sheets should be completed with the details listed in **Appendix D**. If necessary the comments section should describe any changes from routine sampling procedures. If applicable, this should include reasons for samples not being lifted or extreme weather conditions.
- 1.15 Where pre-labelled bottles are not used, all the information contained on the field sheet should also be recorded on the bottle label and initialled by the sampler.

## 2. Tap Sterilisation - Flaming

- 2.1 Sterilisation of sample taps by flaming should only be carried out where it is deemed to be safe to do so and the tap is metal. Generally, in domestic situations, flaming is not recommended. Do not use gloves when handling a blowtorch.
- 2.2 Clean the outside of the tap, to remove any deposits of grease or dirt, with an alcohol wipe or paper towel moistened with 1% (w/v) chlorine solution.
- 2.3 Using a gas blowtorch, thoroughly flame around the mouth of the tap using a tight blue flame and work up the spout to the body of the tap until the water held in the spout boils. Care should be taken to ensure that hot water which may spurt out of the tap during flaming does not cause injury.
- 2.4 After flaming, care should be taken when turning on the tap. Run the water to waste for at least 30 seconds, adjust to a steady flow to avoid splashing and take the sample (refer to **Step 1.10**).

### 3. Tap Sterilisation – Chlorine Solution

- 3.1 Disinfection of taps using chlorine solution (1% (w/v) available chlorine) can be carried out on taps where flaming is not appropriate. This method is suitable for both plastic and metal taps.  
*[Note: A fresh 1% (w/v) chlorine solution should be prepared each day (see Section 4). Where the solution is purchased pre-prepared, ensure the shelf-life of the solution is satisfactory before use.]*
- 3.2 **WARNING:** The chlorine solution used in this procedure is corrosive and should be handled with care and stored appropriately when transporting. Both gloves and eye protection should be worn when handling this solution. If the solution comes into contact with skin or clothing, the area should be immediately washed with copious amounts of water.
- 3.3 Clean the outside of the tap, to remove any deposits of grease or dirt, with an alcohol wipe or paper towel moistened with 1% (w/v) chlorine solution.
- 3.4 Using the wash bottle containing chlorine solution of 1% (w/v) available chlorine spray the outside of the tap and inject the inside of the tap spout.
- 3.5 Leave the tap for a **minimum of 2 minutes** to allow the chlorine to disinfect the tap. Then run the tap to waste for a further 2 minutes to ensure all the chlorine has been flushed away before taking the sample (refer to **Step 1.10**).
- 3.6 Consult relevant **Material Data Safety Sheet (Appendix I)** for precautions required in the handling of chlorine solution.

## 4. Preparation of 1% (w/v) Chlorine Solution

- 4.1 A chlorine solution, of 1% (w/v) available chlorine, must be prepared each day it is required.  
*[Note: This procedure uses 2.5g Presept tablets and a 250ml wash bottle, if either item differs then refer to the manufacturer's instructions for the preparation of 1% (w/v) chlorine solution.]*
- 4.2 Put on safety glasses and gloves and fill a **250 ml** wash bottle to approximately 1/3 full with distilled water; if not available, then tap water may be used.
- 4.3 Slowly add two Presept tablets (2.5 grams), one at a time, into the wash bottle. Swirl the wash bottle until both tablets have dissolved. This should be carried out in a well ventilated area. As the tablets dissolve, gases will be given off; you should avoid inhaling these gases.
- 4.4 Make up to the 250ml mark on the wash bottle with distilled or tap water. Place the lid on the bottle and gently invert the bottle over a sink to mix the solution. Any spillages should be washed away with copious amounts of water.
- 4.5 The bottle must be labelled 'Chlorine Solution - 1% (w/v) available chlorine' along with the date prepared and an appropriate hazard label.
- 4.6 To dispose of unused solution, flush down a drain or sink with copious amounts of water.
- 4.7 Consult relevant **Material Data Safety Sheet (Appendix I)** for precautions required in the handling of Presept tablets and chlorine solution.

## 5. On-site Determination of Free and Total Chlorine

- 5.1 Where treatment of the water at a site is by chlorination, the amount of free and total chlorine in the water should be determined as a measure of the level of disinfection.  
*[Note: If the chlorine residuals measured differ significantly from the range expected at individual sites, the person responsible for the private supply should be informed.]*
- 5.2 Commercial hand-held meters are available for the determination of free and total chlorine levels.
- 5.3 A copy of the manufacturer's instructions for the chlorine meter being used should be placed in **Appendix E** and these instructions should be followed in the measurement of free and total chlorine and for the maintenance and calibration of the meter.
- 5.4 Chlorine meters are calibrated by the manufacturer but check standards are available as a means to validate the calibration.
- 5.5 The meter should be validated as per manufacturer's instructions (ensure check standards are within expiry dates) and records of the validation kept in **Appendix F**.
- 5.6 Consult relevant **Material Data Safety Sheet (Appendix I)** for precautions required in handling reagents for use with chlorine meters.

## 6. On-site Determination of Chlorine Dioxide

- 6.1 Where treatment of the water at a site is by the addition of chlorine dioxide, the amount of chlorine dioxide in the water should be determined as a measure of the level of disinfection.  
*[Note: If the chlorine dioxide residuals measured differ significantly from the range expected at individual sites, the person responsible for the private supply should be informed.]*
- 6.2 Commercial hand-held meters are available for the determination of chlorine dioxide levels.
- 6.3 The manufacturer's instructions for the chlorine dioxide meter being used should be placed in **Appendix G** and these instructions should be followed in the measurement of chlorine dioxide and for the maintenance and calibration of the meter.
- 6.4 All chlorine dioxide meters are calibrated by the manufacturer but check standards are available as a means to validate the calibration.
- 6.5 The meter should be validated as per manufacturer's instructions (ensure check standards are within expiry dates) and records of the validation kept in **Appendix H**.
- 6.6 Consult relevant **Material Data Safety Sheet (Appendix I)** for precautions required in handling reagents for use with chlorine dioxide meters.

## 7. Sample Storage and Transportation

- 7.1 After the samples have been taken the bottles must be stored and transported correctly.
- 7.2 Bacteriological bottles should be stored upright in a cool box containing appropriate ice packs to retain a temperature, during transportation and storage, of between 2 and 8°C.  
*[Note: The inside of cool boxes should be cleaned down with a paper towel soaked in 1% (w/v) chlorine solution prior to use. Care should be taken as detailed in **step 3.2.**]*
- 7.3 Chemical samples should be replaced in any protective wrapping provided with the bottles, and placed in the sample crate.
- 7.4 The samples should be returned as soon as possible to the laboratory to ensure analysis is undertaken within the timescales required by the laboratory.
- 7.5 If there is to be any significant delay between sampling and analysis, samples should be stored so as to ensure there is no material change which could significantly affect the sample results. For example, bacteriological samples should be kept in the dark between 2 and 8°C and analysed within 24 hours. The laboratory should be contacted for advice as appropriate, as samples which have not been stored correctly may not be suitable for analysis.

## 8. References

1. Private Water Supplies Technical Manual – Published by the Scottish Executive, June 2006 (ISBN 0-7559-5151-4)  
– [www.privatewatersupplies.gov.uk](http://www.privatewatersupplies.gov.uk)
2. The Microbiology of Drinking Water (2002) – Part 2  
– Practices and procedures for sampling  
<http://www.environment-agency.gov.uk/static/documents/Research/mdwpart2.pdf>
3. Methods for the Examination of Waters and Associated Materials – Chemical disinfecting Agents in waters and effluents (2008)  
[http://www.environment-agency.gov.uk/static/documents/Research/chlorine218\\_1985298.pdf](http://www.environment-agency.gov.uk/static/documents/Research/chlorine218_1985298.pdf)
4. BS 1427 Guide to on-site test methods for the analysis of waters, 2009 (ISBN 978-0-580-59059-7)

## Appendices

Appendix A – Sampling Procedure Flow Chart

Appendix B – Sample Bottle Types and Descriptions

Appendix C – Sample Kit

Appendix D - Field sheet records

Appendix E – Instructions for use of Chlorine Meter

Appendix F – Validation of Chlorine Meter

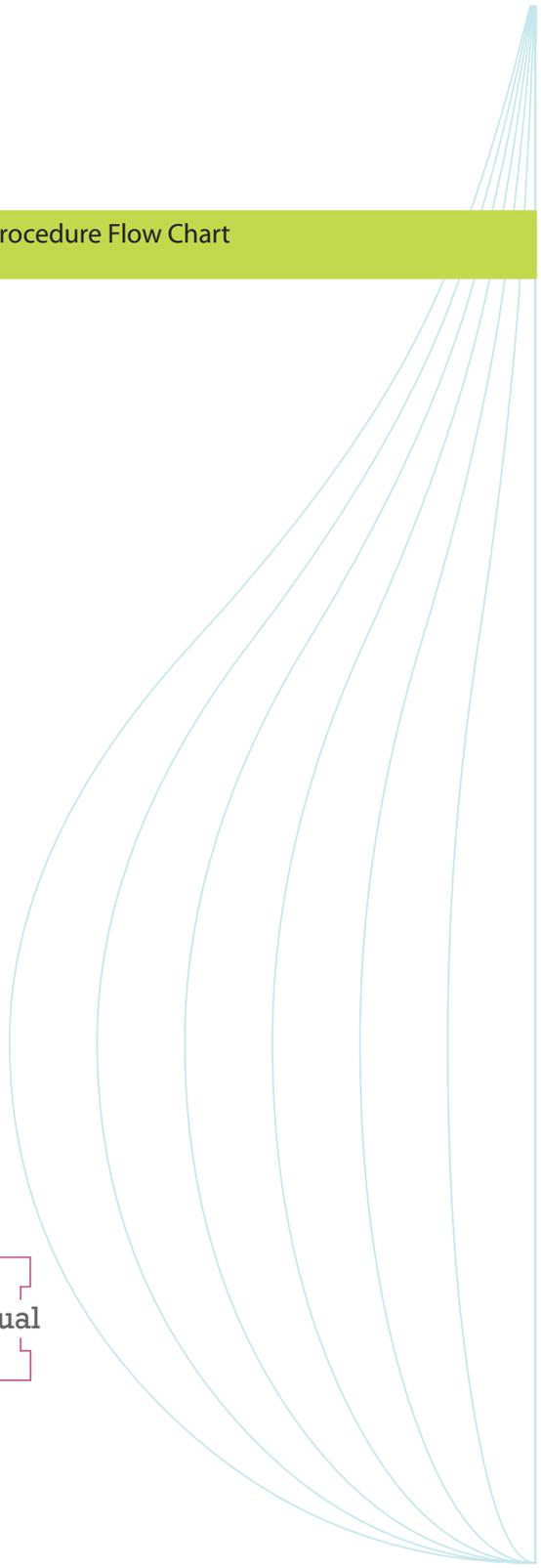
Appendix G – Instructions for use of Chlorine Dioxide Meter

Appendix H - Validation of Chlorine Dioxide Meter

Appendix I – Material Safety Data Sheets

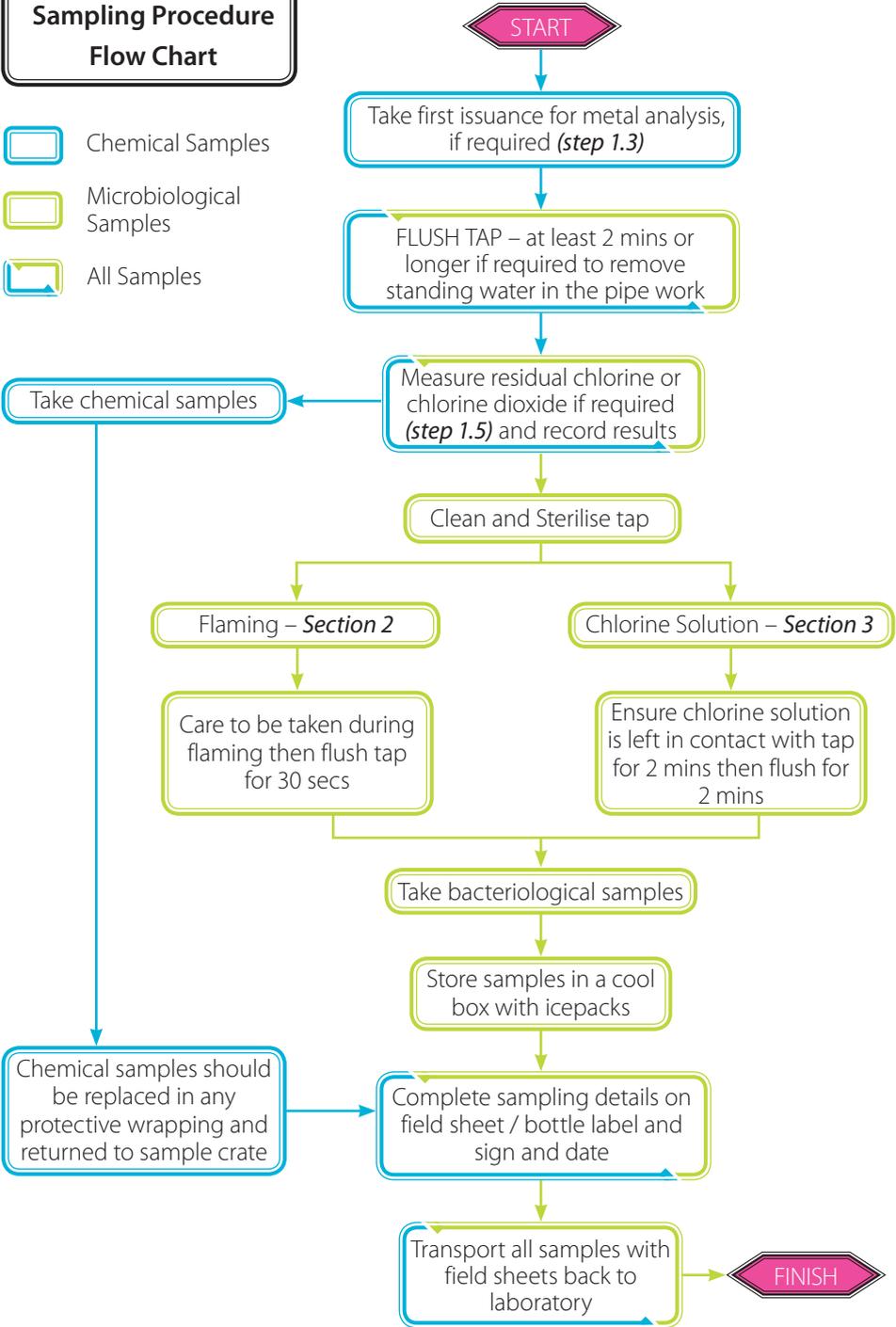
***Note:** The relevant paper work should be inserted into Appendices B, E, F, G, H and I. This information will be specific to the individuals using the manual.*

Appendix A – Sampling Procedure Flow Chart

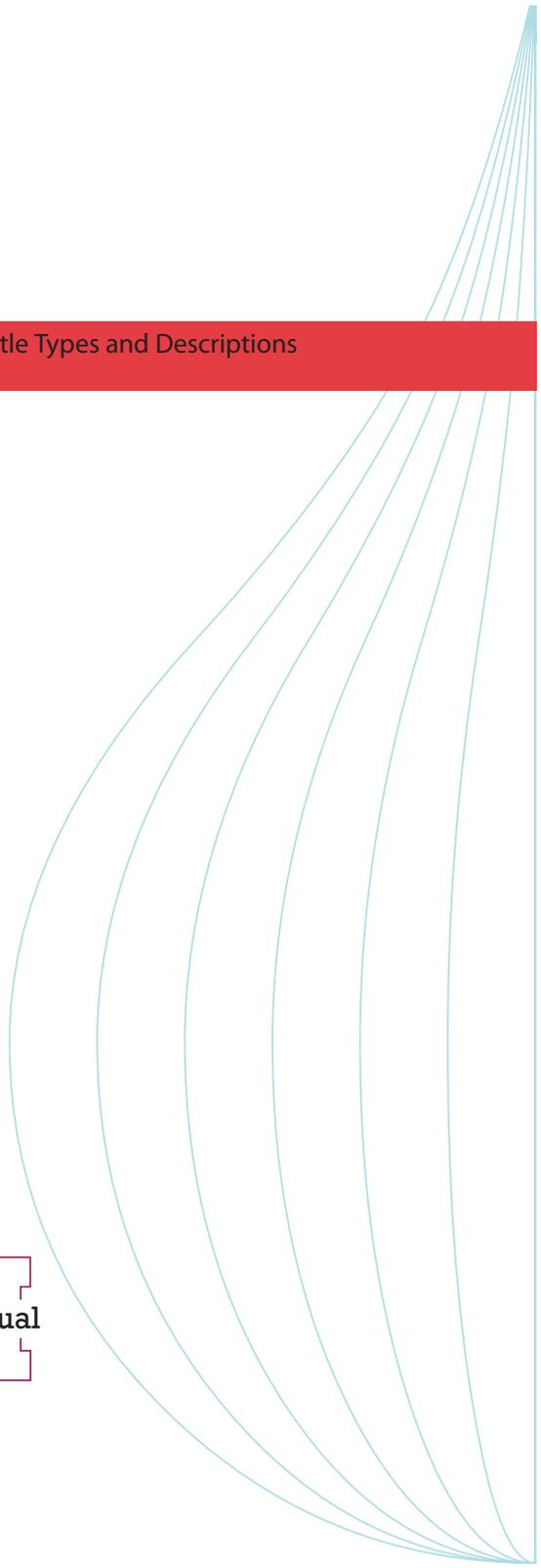


**Appendix A  
Sampling Procedure  
Flow Chart**

- Chemical Samples
- Microbiological Samples
- All Samples



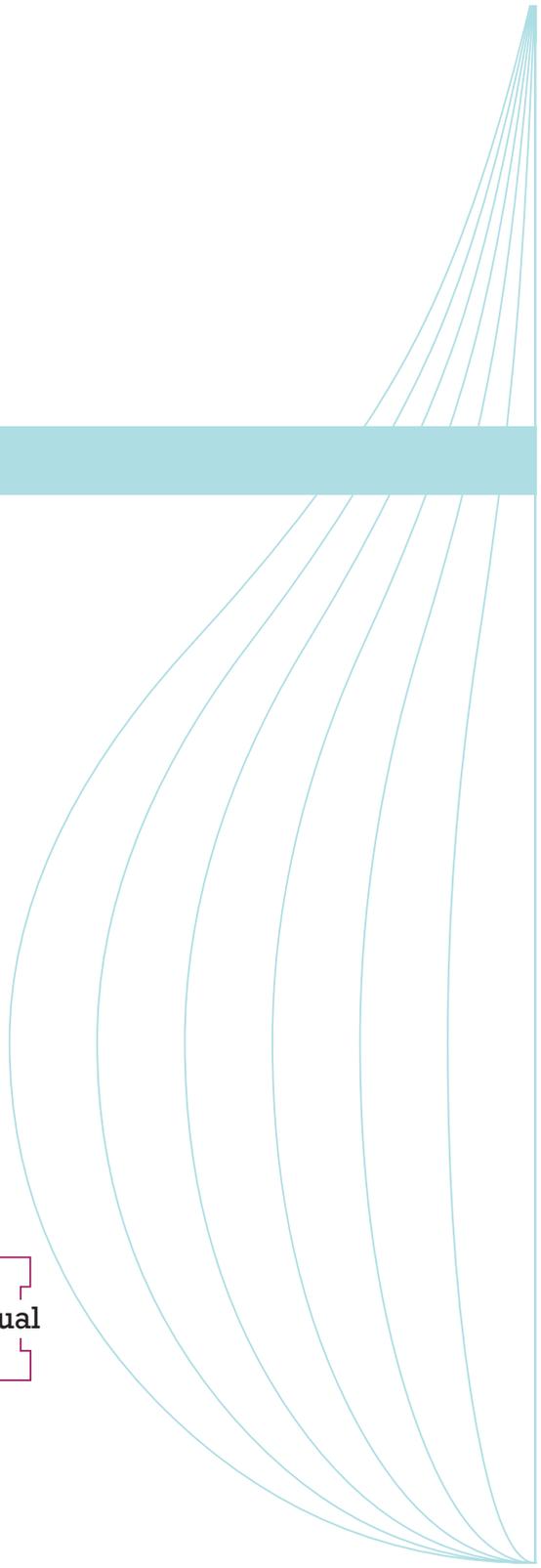
Appendix B – Sample Bottle Types and Descriptions



Insert list of bottle types and descriptions as provided by the analysing laboratory.

Appendix C – Sample Kit

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## APPENDIX C – SAMPLE KIT

- Protective gloves
- Safety glasses
- Alcohol wipes (70% isopropyl alcohol)
- 1% (w/v) chlorine solution in labelled 250ml wash bottle for tap sterilisation (**Section 3**)
- Gas blowtorch and lighter
- Chlorine meter with reagents (if required)
- Chlorine dioxide meter with reagents (if required)
- Timer or watch with second hand
- Field sheets
- Waterproof pen
- Sample bottles and crate
- Cool box and ice packs
- Paper towels

Appendix D - Field sheet records

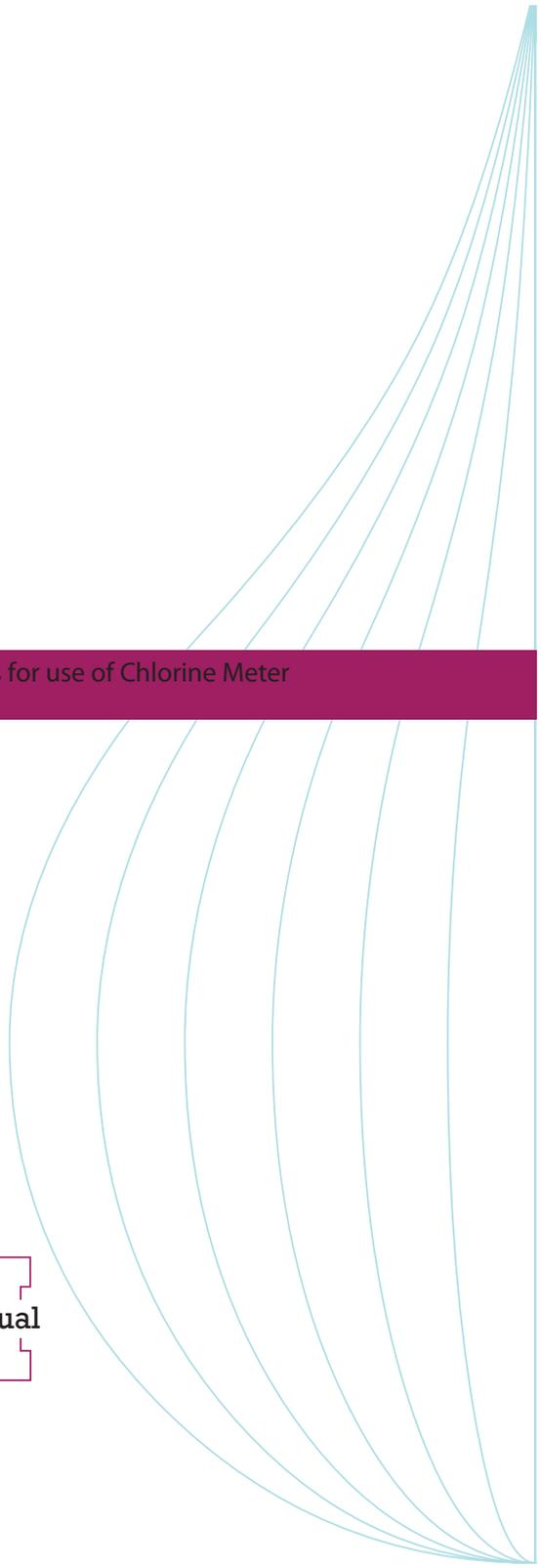
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## APPENDIX D – FIELD SHEET RECORDS

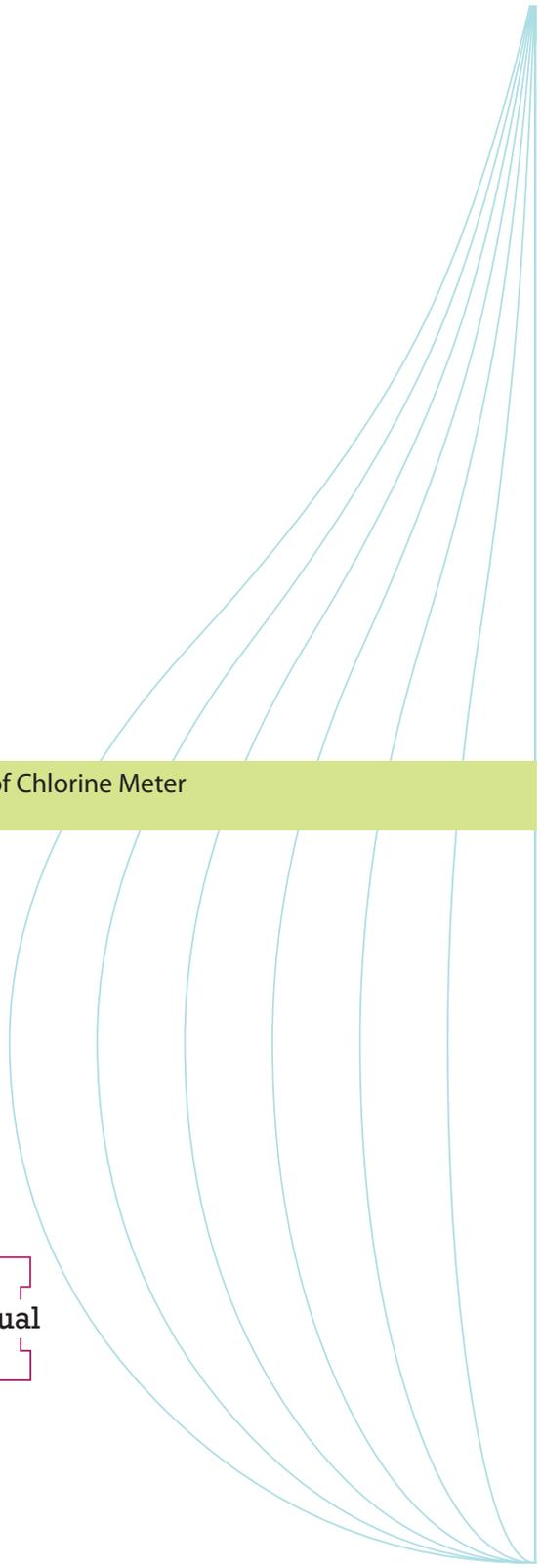
As a minimum, the following details should be recorded on a field sheet for each private water supply sample collected:

- Site Code/Name - this should be a unique identifier used consistently to distinguish;
  - Local Authority/Council,
  - private water supply site,
  - and sample point for supply.
- Sample date and time
- Suite(s) of analysis/parameters for which the sample is to be analysed (unique to receiving laboratory)
- Number of bacteriological bottles filled
- Number of chemical bottles filled
- Record of any measurements of disinfectant residuals (e.g. chlorine or chlorine dioxide)
- Comments section to record any changes from routine sampling procedures
- Sampler name
- Signature/initials of sampler
- Chain of custody for samples to include date/signatures of receipt by the laboratory
- Unique laboratory sample number assigned to the sample



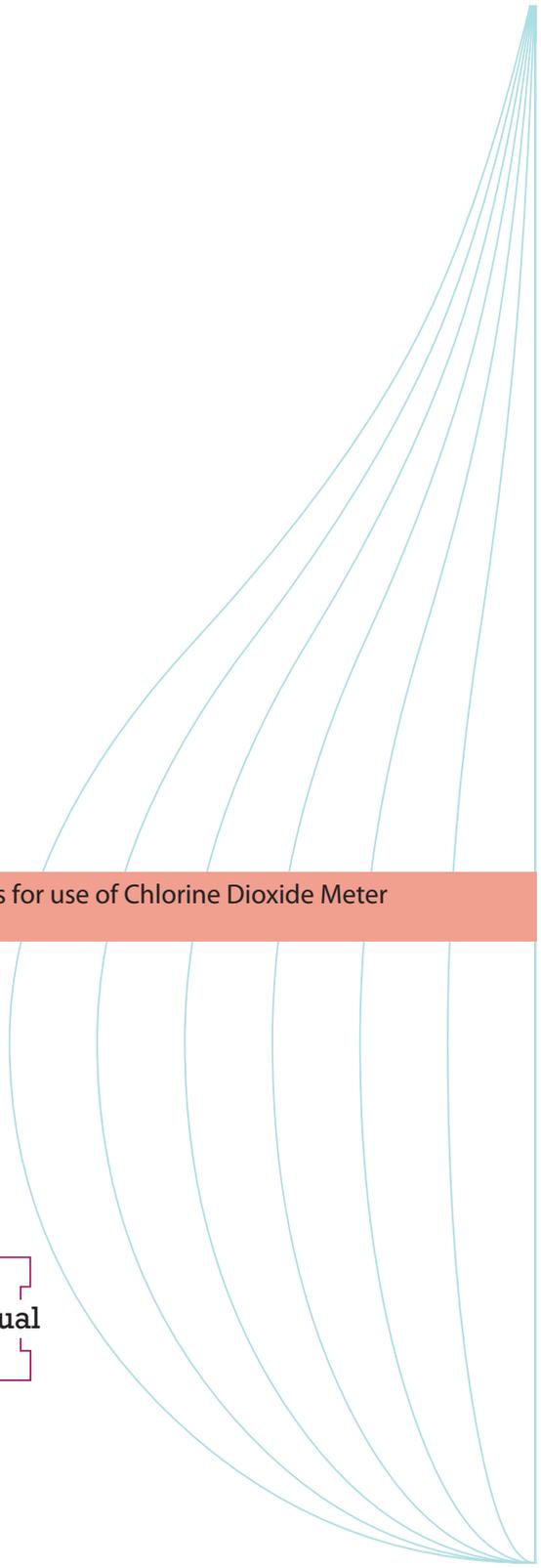
Appendix E – Instructions for use of Chlorine Meter

Insert instructions for use of Chlorine Meter



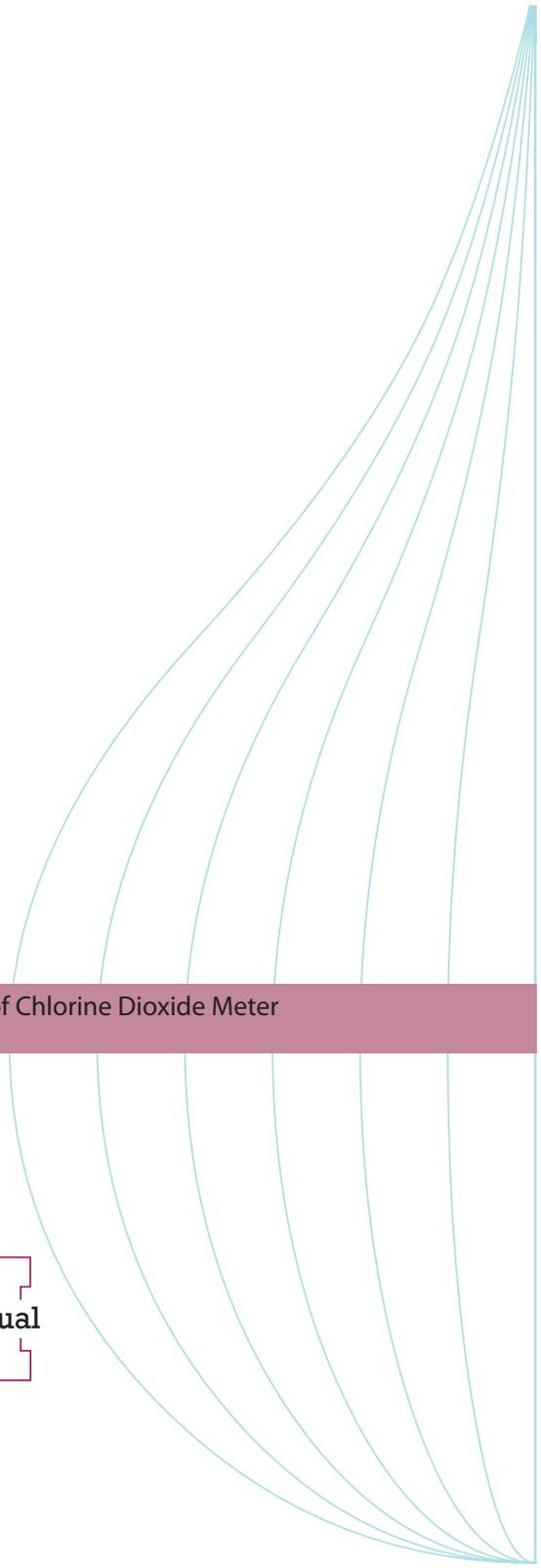
Appendix F – Validation of Chlorine Meter

Insert validation records for Chlorine Meter



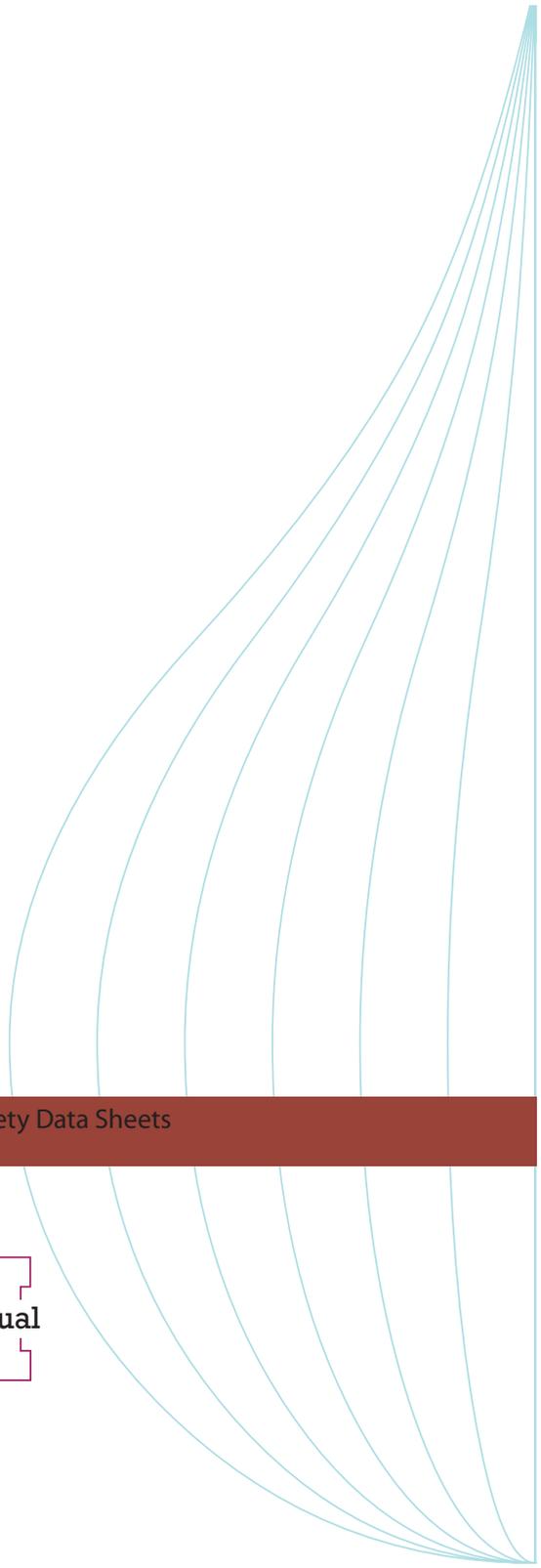
Appendix G – Instructions for use of Chlorine Dioxide Meter

Insert instructions for use of Chlorine Dioxide Meter



Appendix H - Validation of Chlorine Dioxide Meter

Insert validation records for Chlorine Dioxide Meter



Appendix I – Material Safety Data Sheets

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Insert Material Safety Data Sheets

The logo consists of two rows of stylized, overlapping letters. The top row contains the letters 'P', 'W', 'S', 'S', 'M' and the bottom row contains 'M', 'A', 'N', 'U', 'A', 'L'. Each letter is formed by a single continuous line in a different color: green, red, blue, orange, and purple. The letters are interlocked, with the bottom row's letters appearing to be nested within or overlapping the top row's letters.

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