WATER REGULATIONS ADVISORY SCHEME LTD

DRINKING WATER SAFETY PLAN

PROTECTING THE QUALITY OF WATER FOR DOMESTIC USE WITHIN PREMISES

INTRODUCTION

Drinking Water Safety Plans assess the risks to drinking water quality which occur after the water leaves the public water supplier's pipes and enters the plumbing systems of private premises. The tables following are to assist anyone who is preparing these plans and identifies possible risks and counter measures affecting the safety of water for domestic purposes within premises. It was prepared by a working group for WRAS made up of representatives of Water Suppliers Regulations Managers and was approved by the WRAS Technical Committee.

RISK IDENTIFICATION

Factors considered

The risk identification for the Domestic Premises Water Safety Plan has for consistency adopted a tabular format and similar headings to those used in preparation of the Water Safety Plans by Water Suppliers for the other parts of the drinking water supply system. A brief explanation is given in Table 1 of the purpose of each column.

For plans of the other parts of the water supply system, the last three columns (critical limits, monitoring and records) related to the policies and practices of the individual Water Supplier, but as they are not as relevant to customers and were considered to be 'Water Supplier specific', for the Domestic Premises Plan their completion has been left to the discretion of the Water Supplier.

Table 2 summarises the hazardous events identified as affecting water for domestic purposes – principally drawn up for domestic dwellings but with some additional entries (shaded boxes) relating to the use of water for domestic purposes in industrial premises.

Counter measures

Many of the counter measures require compliance with the Water Fittings Regulations and rely upon education & awareness of installers and customers (users). Where appropriate, WRAS publications are referred to (Information and Guidance Notes, Approved Installation Methods and Advisory booklets). With the exception of the Water Regulations Guide (which is sold by WRAS) the other publications are available free of charge on the WRAS website (click on Publications on the WRAS home page) .

WATER SAFETY PLAN - WATER FOR DOMESTIC USE IN PREMISES RISKS AFFECTING WATER QUALITY AND THEIR CONTROL MEASURES				
RISKS AND CONTROL MEASURES				**Water Supplier specific**
Nature of risk and Hazardous event	**Legislation, Recommendation, Code of Practice, or Advisory reference**	**Control Measure**	**Corrective action**	**Monitoring procedure**
In what ways can the risk occur?	Regulation, standard or advisory recommendation which refers to a requirement.	What should be done to prevent the hazardous event occurring?	If the hazardous event has occurred, what can be done to remedy the problem?	How will the degree of risk be measured?

TABLE 1: DESCRIPTION OF THE HEADINGS ADOPTED

GLOSSARY OF TERMS USED FOR TABLE 2 (BELOW)

AIM	WRAS Approved Installation Methods, endorsed by Water Suppliers and relating to workmanlike manner (Reg. 4(6))
Approved Contractors	Members of a recognised approved contractors scheme set up under the Water Fittings Regulations e.g. WIAPS
BS6700	Reference to the 2006 version of the British Standard which gives requirements for the design of water systems for domestic purposes.
CoP L8 (HSE)	Approved Code of Practice & Guidance on Legionnaires' disease published by Health & Safety Executive
G11.7 etc	Refers to Guidance clauses in the Water Regulations Guide
IGN 9-04-04	Information and Guidance Note available from WRAS and on the website (www.wras.co.uk/publications)
Inspection	Routine inspection of new or existing premises undertaken by Water Suppliers as part of enforcement of the Water Fittings Regulations.
Notification	The Water Supply (Water Fittings) Regulations 1999 require that for most plumbing work anyone who proposes to install water fittings must notify the details to the local Water Supplier and have its consent before work starts.
Reg 3	Clause in the Water Supply (Water Fittings) Regulations 1999
RPZ certificates	Test report certificates for reduced pressure zone valves required to be sent to the Water Supplier at regular intervals.
Sch 2 (15)(2)	Refers to clause (15)(2) of Schedule 2 of the Regulations
Water Quality sampling	Water quality sampling from customers' taps undertaken by Water Supplier as part of statutory monitoring, or for surveys.
WRAS Interpretation	Specific interpretation endorsed by the WRAS Technical Committee, available from WRAS and website.

Below: TABLE 2: Risk assessment – Water for Domestic Use

Shaded boxes in first four columns relate to the use in industrial or commercial premises of water for domestic purposes.

WATER SAFETY PLAN - WATER FOR DOMESTIC USE IN PREMISES RISKS AFFECTING WATER QUALITY AND THEIR CONTROL MEASURES				
RISKS AND CONTROL MEASURES				**Water Supplier specific**
Nature of risk and Hazardous event	**Legislation, Recommendation, Code of Practice, or Advisory reference**	**Control Measure**	**Corrective action**	**Monitoring procedure**
0 PROVISION OF DRINKING WATER TAP				
0.1 Taps or other draw-off points used for drinking water, which are of unsuitable construction or materials or are in unsuitable locations, can result in contamination of water for domestic purposes.	Sch 2 (26) All premises supplied with water for domestic purposes shall have at least one tap conveniently situated for the drawing of drinking water. Sch 2(27) A drinking water tap shall be supplied with water from (a) a supply pipe, (b) a pump delivery pipe drawing water from a supply pipe; or (c) a distributing pipe drawing water exclusively from a storage cistern supplying wholesome water. G26.1 All premises supplied with water for domestic purposes should have at least one conveniently situated tap for supplying drinking water directly from the supply pipe. G26.2 In houses, a drinking water draw-off tap should normally be sited over the kitchen sink.	Education & awareness Notification Use Approved Contractors	Relocate or replace drinking water tap as necessary.	Inspection Water quality sampling

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
1 STAGNATION				
1.1 'Dead legs': Stagnation can occur where water is held in pipes which are never used because the end fittings (taps, appliances etc) have been removed.	G11.7: Any draw-off fitting that is permanently removed from the installation should have the branch pipe serving the fitting disconnected at its source. BS6700: §7.8: Disconnection of unused pipes and fittings. If any part of an installation becomes redundant, and in particular if any appliance or fitting is disconnected, other than for the purpose of repair, maintenance or renewal, then the whole of the pipework supplying water to the disconnected or unused appliance or fitting shall also be disconnected at the source so as to leave no legs of unused pipework.	Use Approved Contractors Inspection & enforcement Notification	Flushing; disinfection; Amend pipework so dead leg is no more than 2 pipe diameters in length	Water quality Complaints Inspection
1.2 Temporarily infrequent use (e.g. en-suite bathroom in guest bedroom). Stagnation can occur where water is held in pipework which is infrequently used.	BS6700: § 6.1.10.1 Where a system is not brought into use immediately after commissioning and it has not been flushed at regular intervals (up to 30 days depending on the characteristics of the water), it shall be disinfected before bringing into use.	Regular flushing programme. Disinfect if required	Introduce limited regular flushing programme	-
1.3 Infrequent use for more than 60 days (e.g. unoccupied premises).	WRAS IGN 9-05-01 Commissioning Plumbing Systems leaflet.	Isolate and drain down or use regular flushing programme (but avoid corrosion of copper plumbing – see IGN 9-05-01))	Introduce limited regular flushing programme	

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
1.4 Stagnation can occur where the installation (e.g. pipe diameter or storage cistern) is over-sized for the flow-through.	Sch 2 (16)(5) Every storage cistern shall be so installed as to minimise the risk of contamination of stored water. The cistern shall be of an appropriate size, and the pipe connections to the cistern shall be so positioned, as to allow free circulation and to prevent areas of stagnant water from developing. BS6700: §5.2.3.1.2 Table 1 Recommended minimum storage of cold water for domestic purposes (hot and cold outlets). IGN 9-04-04 Cold Water Storage Cisterns – Design Recommendations for Mains Supply Inlets	Education & awareness Proper design; Reduce storage volume if demand changes. Alter draw-off. Inspection & enforcement	Disinfect & flush. Reduce storage volume.	Water quality sampling. Water quality complaints Inspections
1.5 Stagnant areas can develop if the flow of water through a cistern short-circuits parts of it.	Sch 2 (16)(5) G16.15 Where the required capacity of water is provided by the use of two or more cisterns, the inlets and the outlets of the cisterns should be located so that water passes through the whole of the cisterns and short-circuiting does not occur.	Proper design and installation	Disinfect & flush. Reduce storage volume. Alter draw-off arrangements.	Water quality sampling. Water quality complaints Inspections

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
2 INGRESS				
2.1 Installing pipes underground at too shallow a depth or poorly supported can cause leaking joints which allow ingress of contaminants if water pressure drops.	Sch 2 (4) Every water fitting shall – (a) be watertight; (b) be so constructed and installed as to – (i) prevent ingress by contaminants, and (ii) inhibit damage by freezing or any other cause; (c) be so installed as to minimise the risk of permeation by, or deterioration from contact with, any substance which may cause contamination; and (d) be adequately supported. G7.7: Wherever practicable and except for pipes laid under a building, the vertical distance between the top of every water pipe installed below ground and the finished ground level should be: a. not less than 750mm; and b. not more than 1,350mm.	Education & awareness Inspection & enforcement Use Approved Contractors	Repair and protect against further damage. Flush pipes and disinfect if necessary.	Inspection
2.3 Storage cisterns with poorly-fitting or non-existent covers or unscreened vents allow ingress of contaminants.	Sch 2 (16)(5): Every storage cistern shall be so installed as to minimise the risk of contamination of stored water. G16.13: Cisterns storing water for domestic purposes …… should have a rigid, close fitting and securely fixed cover which is not airtight but which excludes light and insects from the cistern; be made of a material or materials which do not shatter or fragment when broken and which will not contaminate any water which condenses on its underside; and, in the case of a cistern storing more than 1,000 litres of water, be constructed so that the cistern may be inspected and cleansed without it having to be wholly uncovered (see Diagrams G16.13a and G16.13b).	Provide adequate cover	Flush & disinfect Provide adequate cover of suitable material, screens for vents etc.	Water quality complaints Inspection

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
2.4 Storage cisterns/service reservoirs supplying water in bulk to two or more premises require suitable hygienic protection.	Sch 2 (16)(5): As above. G16.13 As above. IGN 9-04-04: Cold Water Storage Cisterns – Design Recommendations for Mains Supply Inlets	Education & awareness IGN 9-04-04 Designed & built in compliance with Regs	Remedy	Inspection Water Quality sampling
2.5 Some organic chemicals in contact with plastic pipe can permeate through them, resulting in water contamination.	G4.14 Water fittings should be installed to minimise any risk of contamination by permeation of fluids through the material or materials used. G4.15 Water fittings that are made of a material which is susceptible to permeation by any fluid that causes, or is likely to cause, contamination of water passing through the fitting, should not be laid or installed in such a location, in relation to other services or contaminated ground, that permeation occurs. IGN 9-04-03: The Selection of Materials for Water Supply Pipes to be Laid in Contaminated Land	Risk assess & use protected pipe where necessary.	Replace damaged pipe and contaminated soil, if necessary.	Soil & Water quality sampling Water quality Complaints
3 AESTHETIC DETERIORATION				
3.1 Air trapped under pressure in plumbing systems can dissolve into the water, resulting in 'air locks' which interfere with flow and causing a white discolouration due to very fine air bubbles, when the pressure is released as water discharges from outlets.	G4.18 Water fittings should be adequately supported, the spacing for support being dependent on the material of the pipes. Allowance should be made to accommodate any reasonable foreseeable movement, including thermal movement, in accordance with BS 6700. BS6700 §6.1.7.2: Spacings for pipe fixings The spacings for fixings for internally located piping shall be in accordance with Table 12. WRAS 9-05-01 Commissioning Plumbing Systems leaflet	Proper installation and pipe clipping. Venting and purging procedures (WRAS 9-05-01 Commissioning leaflet) Use Approved Contractors	Ensure correct pipe support. Flush pipes to remove trapped air.	Water quality Complaints Inspection

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
CONTAMINATION - MATERIALS				
4.1 Leaching of low concentrations of contaminants from non-metallic materials can adversely affect taste in water and support micro-organism growth.	Sch 2 (2): (1) No material or substance, either alone or in combination with any other material or substance or with the contents of any water fitting of which it forms a part, which causes or is likely to cause contamination of water shall be used in the construction, installation, renewal, repair or replacement of any water fitting which conveys or receives, or may convey or receive, water supplied for domestic or food production purposes. G2.2**:** For non-metallic materials, this requirement is deemed to be met by compliance with the appropriate British Standard, BS 6920: Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of water.	Use BS6920 compliant materials Install suitable point of use backflow protection	Replace or install point of use backflow protection	Water quality Complaints Water quality sampling
4.2 Lead from lead pipes or lead-based solder can dissolve into water which stands in contact with it, leading to contamination and a risk of lead poisoning.	G2.12: Soft solder for capillary jointing of copper or copper alloy water fittings should consist of Tin/Copper, Alloy No. 23 or 24, or Tin/Silver, Alloy No. 28 or 29, complying with BS EN 29453. BS6700: §4.2: No pipe or other water fitting or storage cistern made from lead or internally lined with lead shall be used in new installations or repairs on plumbing systems supplying drinking water. Repairs to existing lead services shall be by replacement with other materials (see also 5.6.2.1). Lead or any substance containing lead shall not be used in the jointing of pipes or fittings. WRAS 9-04-02 Fluxes & Solders leaflet	Prohibition on lead solder. Replace lead pipes Use Approved Contractors Correct selection and use of solders following advice in the leaflet WRAS 9-04-02 Fluxes & Solders.	Replace fittings or material Lead pipe replacement in accordance with Water Supplier's policy.	Sampling

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
4.3 Use of chemical treatment of the premises water supply (e.g. for Legionella or corrosion control) could lead to contamination unless correctly specified and controlled.	Reg 3(2): No water fitting shall be installed, connected, arranged or used in such a manner that it causes or is likely to cause waste, misuse, undue consumption or contamination of water supplied by a water undertaker.	Manufacturers instructions WRAS Interpretation on wholesomeness of water dosed with chlorine dioxide.	Ensure correct selection of chemicals and control of dosing and backflow.	Sampling programme Inspection
4.4 Corrosion of metals in contact with water can result in unacceptable concentrations causing aesthetic problems or risk to health. Corrosion can occur due to the age of the materials or be accelerated by electrolytic action as a result of incorrect metals being adjacent in the plumbing system.	Sch 2(3a): Every water fitting shall be immune to or protected from corrosion by galvanic action or by any other process which is likely to result in contamination or waste of water. G3.2: Pipes of different metallic materials are not to be connected unless suitable precautions are taken to ensure that corrosion through galvanic action cannot take place.	Apply protective coatings. Education & awareness Use Approved Contractors Inspection & enforcement	Replace metallic fittings when necessary. Apply protective coatings. Remove mixed metals	Water quality Complaints Leaks Inspection
4.5 The nature of some water supplies allows them to corrode brass fittings by selectively removing zinc, embrittling the fitting and risking failure and contamination.	G7.4: Water fittings are to be resistant to corrosion and, where specified, to dezincification.	Selection of appropriate materials. Use Approved Contractors Inspection & enforcement	Remove & replace with suitable fittings.	Inspection Leaks

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
4.6 Residues of acidic fluxes used with copper soldered joints can result in corrosion of the pipework or fittings, leading to contamination and premature failure of the fittings.	Reg 3(3)(i) No water fitting shall be installed, connected, arranged or used which by reason of being damaged, worn or otherwise faulty, causes or is likely to cause waste, misuse, undue consumption or contamination of water supplied by a water undertaker. Reg 4(5): Every water fitting shall be installed, connected, altered, repaired or disconnected in a workmanlike manner.	Flush after installation. Follow procedures of WRAS 9-04-02 Fluxes & Solders leaflet and WRAS 9-05-01 Commissioning leaflet Use Approved Contractors	Replace joints. Citric acid flush of system.	Water quality Complaints

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
CONTAMINATION - BACKFLOW				
5.1 Unless there is adequate point-of-use protection, backflow can allow contaminated fluids to pass from outlets or appliances back into the plumbing system, affecting water for drinking and other domestic purposes. Fittings must be adequately designed and correctly installed.	Reg 4: (1) Every water fitting shall (a) be of an appropriate quality and standard; and (b) be suitable for the circumstances in which it is used. Reg 3(2): No water fitting shall be installed, connected, arranged or used in such a manner that it causes or is likely to cause waste, misuse, undue consumption or contamination of water supplied by a water undertaker. Reg 3(3): No water fitting shall be installed, connected, arranged or used which by reason of being damaged, worn or otherwise faulty, causes or is likely to cause waste, misuse, undue consumption or contamination of water supplied by a water undertaker. Sch 2 (15)(1):Subject to the following provisions of this paragraph, every water system shall contain an adequate device or devices for preventing backflow of fluid from any appliance, fitting or process from occurring. Sch 2 (15)(3) The device used to prevent backflow shall be appropriate to the highest applicable fluid category to which the fitting is subject downstream before the next such device.	Use WRAS-Approved fittings Use Approved Contractors Education & awareness	Provide adequate point-of-use and zone backflow protection.	Inspection

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
5.2 Modification or extension of existing plumbing systems may compromise the backflow protection, leading to an increased risk of contamination. Similarly, users should be aware that altering appliances or adding hoses, filters or other devices to taps can compromise the backflow prevention arrangements. Failure to maintain plumbing fittings can also compromise the performance of backflow protection devices.	Reg 3(3): No water fitting shall be installed, connected, arranged or used in such a manner that it causes or is likely to cause waste, misuse, undue consumption or contamination of water supplied by a water undertaker.	Education & awareness Use Approved Contractors Inspection	Provide adequate point-of-use and zone backflow protection.	Inspection RPZ certificates
5.3 Backflow can occur upstream of a pump if it is drawing more water than the pipework can properly supply, creating a negative pressure upstream. This can occur with the use, for example, of pressure washers and shower booster pumps.	Reg 5(1): Subject to paragraph (2), any person who proposes to install a water fitting in connection with any of the operations listed in the Table below- (a) shall give notice to the water undertaker that he proposes to begin work; (b) shall not begin that work without the consent of that undertaker which shall not be withheld unreasonably; and (c) shall comply with any conditions to which the undertaker's consent is subject. (Table) 4(d) The installation of a pump or booster drawing more than 12 litres per minute, connected directly or indirectly to a supply pipe. G15.1 Except where expanded water from hot water systems or instantaneous water heaters is permitted to flow back into a supply or distributing pipe, every water fitting through which water is supplied for domestic purposes should be installed in such a manner that no backflow of fluid from any appliance, fitting or process can take place.	Notification Point of use protection	Provide adequate point-of-use and zone backflow protection.	Water quality Complaints Inspection & enforcement

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
5.4 In particular, the use of hydrants/ standpipes on industrial premises can be a serious risk of contamination unless they are properly protected against backflow.	Sch 2(15): (1) Subject to the following provisions of this paragraph, every water system shall contain an adequate device or devices for preventing backflow of fluid from any appliance, fitting or process from occurring. Sch 2(15): (3) The device used to prevent backflow shall be appropriate to the highest applicable fluid category to which the fitting is subject downstream before the next such device.	Notification Backflow protection Secondary backflow prevention Water Suppliers procedures for use of hydrants	Comply	Water quality Complaints Inspection Pressure monitoring
CONTAMINATION – CROSS CONNECTION				
6.1 The connection of a mains-water plumbing system to a system containing water from another source (e.g. recycled rain water or greywater re-use) or from a fire sprinkler system can be a serious risk of contamination, unless adequate backflow protection is installed.	Sch 2(14)(1): Any water fitting conveying – (a) rain water, recycled water or any fluid other than water supplied by a water undertaker; or (b) any fluid that is not wholesome water; shall be clearly identified so as to be easily distinguished from any supply pipe or distributing pipe. (2) No supply pipe, distributing pipe or pump delivery pipe drawing water from a supply pipe or distributing pipe shall convey, or be connected so that it can convey, any fluid falling within sub-paragraph (1) unless a device for preventing backflow is installed in accordance with Paragraph 15. IGN 9-02-04 Reclaimed Water Systems - Information About Installing, Modifying or Maintaining Reclaimed Water Systems IGN 9-02-05 Marking and Identification of Pipework for Reclaimed (Greywater) Systems	Education & awareness Follow procedures in IGN 9-02-04 & 9-02-05 Educate manufacturer & supplier Inspection	Remedy	Notification Inspection Water quality Complaints

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
6.2 Undertaking work on existing plumbing systems to extend or modify them carries of a risk of inadvertently cross-connecting between wholesome and other sources of water.	Sch 2(15)(1): Subject to the following provisions of this paragraph, every water system shall contain an adequate device or devices for preventing backflow of fluid from any appliance, fitting or process from occurring. Reg 5. (1) Subject to paragraph (2), any person who proposes to install a water fitting in connection with any of the operations listed in the Table below- (a) shall give notice to the water undertaker that he proposes to begin work; (b) shall not begin that work without the consent of that undertaker which shall not be withheld unreasonably; and (c) shall comply with any conditions to which the undertaker's consent is subject. Table (2): The extension or alteration of a water system on any premises other than a house.	Appropriate backflow protection Education & awareness Inspection (Industrial premises – Notification)	Identify and isolate incorrect connections. Mark pipework appropriately. Install correct backflow protection. Clean and disinfect plumbing if required.	Notification Inspection Water quality Complaints
6.3 Cross connection with private water supplies, chemical storage tanks or lagoons for water for industrial, commercial or agricultural purposes is an additional risk in these types of premises.	Sch 2(15)(1): Subject to the following provisions of this paragraph, every water system shall contain an adequate device or devices for preventing backflow of fluid from any appliance, fitting or process from occurring.	Appropriate backflow protection Education & awareness Inspection	Install zone or whole-site backflow protection. Ensure adequate pipe marking	Notification Inspection Water quality Complaints
6.4 In industrial premises, the presence of hazardous processes and likelihood of pressurised pipelines containing non-wholesome fluids increases the risks of cross connection.	G15.26: Zone protection may be required in other than domestic premises where particular industrial, chemical or medical processes are undertaken. IGN 9-04-05 Report of the Expert Group on the Risk of Contamination of the Public Water Supply by Backflow.	Education & awareness Follow procedures recommended in IGN 9-04-05	Install zone or whole-site backflow protection. Ensure adequate pipe marking.	Notification Inspection Water quality Complaints

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
6.5 Industrial fire fighting systems may contain stagnant water and inhibitors, fire suppressants and antifreeze. All connections must be adequately protected against backflow and marked to minimise the risk of cross connection with fire-fighting systems.	Sch 2 (15) Subject to the following provisions of this paragraph, every water system shall contain an adequate device or devices for preventing backflow of fluid from any appliance, fitting or process from occurring.	Education & awareness Point of use protection IGN 9-04-05 Wholesite & zone protection Zone protection Pipe marking IGN 9-04-05	Install adequate point-of-use and zone backflow protection. Ensure adequate pipe marking.	Notification Inspection Water quality Complaints
CONTAMINATION – MICRO-ORGANISMS				
7.1 Debris left in plumbing systems after installation can cause contamination either directly or by supporting growth of micro-organisms which may give rise to health concerns (e.g. Legionella bacteria), aesthetic problems (e.g. taste or odour in drinking water) or accelerated corrosion of metals.	G13.1 Flushing of installations should be in accordance with BS 6700. BS6700: §6.1.10.1: **Flushing** Every new water service, cistern, distributing pipe, hot water cylinder or other appliance and any extension or modification to such a service shall be thoroughly flushed with drinking water before being taken into use. Where a system is not brought into use immediately after commissioning and it has not been flushed at regular intervals (up to 30 days depending on the characteristics of the water), it shall be disinfected before bringing into use. BS6700: §6.1.10.2: **Disinfection** (more) WRAS AIM 9-05-01 Commissioning Plumbing Systems leaflet	'New Connection Procedures' to require installation in a hygienic manner and flushing procedures. Education & awareness. Inspection. Follow procedures in WRAS Commissioning leaflet. Use Approved Contractors	Flushing to remove debris and disinfect if necessary.	Inspection of new properties (random audits)

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
7.2 Some non-metallic materials can support micro-organism growth either on their surfaces or by leaching nutrients into the water to allow growth elsewhere.	Reg 3(2)(i) No water fitting shall be installed, connected, arranged or used in such a manner that it causes or is likely to cause waste, misuse, undue consumption or contamination of water supplied by a water undertaker. Reg 4(1) Every water fitting shall (a) be of an appropriate quality and standard; and (b) be suitable for the circumstances in which it is used. G2.1: Materials or substances, either alone or in combination, which cause, or are likely to cause, contamination of water should not be used in the construction, installation, renewal, repair or replacement of any water fitting which conveys or receives water supplied for domestic or food production purposes. Particular materials unsuitable for use in contact with water intended for domestic or food production purposes include lead and bitumastic coatings derived from coal tar. G2.2 For non-metallic materials, this requirement is deemed to be met by compliance with the appropriate British Standard, BS 6920: Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of water.	Ensure that only approved materials are used. Refer to the WRAS Water Fittings and Materials Directory. Notification Use Approved Contractors	Replace fittings with unsuitable materials.	Inspection Water quality Complaints
7.3 Failure to maintain water fittings such as filters, reverse osmosis units and water softeners in accordance with the manufacturers' instructions can allow a build-up of micro-organisms which can adversely affect water quality.	Reg 3(3)(i): No water fitting shall be installed, connected, arranged or used which by reason of being damaged, worn or otherwise faulty, causes or is likely to cause waste, misuse, undue consumption or contamination of water supplied by a water undertaker.	Education & awareness Use Approved Contractors	Carry out regular maintenance as required.	Water quality Complaints Inspection

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
7.4 Installation of hot water pipes immediately below cold water pipes, and inadequate insulation of cold pipes and cisterns can allow water temperatures to rise above 25oC, encouraging microbial growth which is detrimental to maintaining water quality.	Sch 2(9): Any pipe supplying cold water for domestic purposes to any tap shall be so installed that, so far as is reasonably practicable, the water is not warmed above 25°C. G9.1 So far as is reasonably practical the temperature of water within cold water pipes should not exceed 20°C and adequate measures should be taken to ensure that this temperature is not exceeded.	Education & awareness Use Approved Contractors	Install adequate insulation. Amend pipe installations if required.	Water quality Complaints Water quality sampling
7.5 In industrial premises where water is stored in little-used cisterns supplying safety showers, measures may be needed to prevent the deterioration of water quality due to the growth of bacteria such as Legionella.	Sch 2(9) Any pipe supplying cold water for domestic purposes to any tap shall be so installed that, so far as is reasonably practicable, the water is not warmed above 25°C.	Education & awareness CoP L8 (HSE) Flushing programme Disinfection	Flush & disinfect Reduce warming by insulation.	CoP L8 monitoring
8 NON-WATER QUALITY RISKS				
8.1 The temperature of hot water in storage systems must be adequate to prevent development of bacteria such as legionella, but there is a risk of scalding especially to the very young, the old and the infirm if the temperature of distributed water at hot water outlets is not controlled.	G18.2 Hot water should be stored at a temperature of not less than 60°C and distributed at a temperature of not less than 55°C. This water distribution temperature may not be achievable where hot water is provided by instantaneous or combination boilers. G18.4 Where practicable the hot water distribution system should be designed and installed to provide the required flow of water at terminal fittings to sanitary and other appliances at a water temperature of not less than 50°C and within 30 seconds after fully opening the tap. This criteria may not be achievable where hot water is provided by instantaneous or combination boilers.	Inspection & enforcement Building Regulations (commercial premises)	Monitor water temperature and reduce where necessary. Install thermostatic mixing valves on outlets.	Inspection Complaints

Nature of risk and Hazardous event	Legislation, Recommendation, Code of Practice, or Advisory reference	Control Measure	Corrective action	Monitoring procedure
8.2 Failure of the safety devices required to prevent the overheating of water in boilers and storage cisterns is rare, but plumbing systems must be adequately installed and maintained to prevent catastrophic failure in the event of overheating.	Sch 2(18) Appropriate vent pipes, temperature control devices and combined temperature pressure and relief valves shall be provided to prevent the temperature of the water within a secondary hot water system from exceeding 100°C. G16.14 Every cistern should be adequately supported to avoid distortion or damage and only installed in a place or position where the inside may be readily inspected and cleansed, and any float operated valve or other controls may be readily installed, repaired, renewed or adjusted. The cistern should have a minimum unobstructed space above of not less than 350mm (see Diagrams G16.14a, G16.14b and G16.14c). Sch 2(12)(1): The water system shall be capable of withstanding an internal water pressure not less than 1½ times the maximum pressure to which the installation or relevant part is designed to be subjected in operation (‘the test pressure’).	Compliance with Building Regulations. Use of Approved products. Inspection. Pressure test after installation.	Maintenance of safety devices. Repair or replace faulty parts of plumbing system.	Complaints