



LEAFLET 19

CONTROL OF LEGIONELLA (INCLUDING HOT AND COLD WATER SYSTEMS AND COOLING TOWERS)

AMENDMENT RECORD

Amd No	Date	Text Affected	Authority and Date
1	Dec 07	All	Defence Estates – Dec 07
2	Apr 08	Inclusion of Legionella Management Plan – DE Document as Annex B	Defence Estates and DSC – Apr 08
3	Jul 08	Section 7 of Annex B – Appointment of Approved Person. First para changed to mirror that in para 4.3.1	Defence Estates and DSC – Jul 08
4	Jul 08	Para 4.3.1 & 4.3.2 Duty Holder responsibilities for RPC Contracts and Non RPC Contracts	Defence Estates and DSC – Jul 08
5	Sep 08	Para 4.3.1 – DE DDFM amended to read “DE DDFM	Defence Estates and DSC – Sep 08
6	Sep 08	Annex B Section 3, Para 3, last sentence has been deleted	Defence Estates and DSC – Sep 08
7	Sep 08	Annex B Section 7 Para 2 DE DDFM to read DE DDEM	Defence Estates and DSC – Sep 08

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LEAFLET 19

CONTROL OF LEGIONELLA (INCLUDING HOT & COLD WATER SYSTEMS AND COOLING TOWERS)

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Foreword

This leaflet is published under the authority of the Chairman of the Defence Occupational Health and Safety Board (OHSB). This leaflet is for application across all areas of MOD and the Armed Forces and has been revised to reflect changes in legislation and or MOD policy.

1. SCOPE

1.1 This leaflet provides guidance for all parts of the MOD Estate involving a work activity and or premises where water is used or stored and where there is a means of creating and transmitting water droplets, and thereby causing a reasonably foreseeable risk of Legionellosis.

2. INTRODUCTION

2.1 Legionnaires' disease is a type of pneumonia caused by organisms found in water. It is the most well-known and serious form of a group of diseases known as Legionellosis. Legionellosis is the term used for infections

caused by legionella pneumophila and other similar bacteria. Infection is caused by inhaling fine air borne water droplets or particles containing the viable bacteria; the disease cannot be passed from one person to another. Everyone is potentially susceptible to infection but some people are at higher risk, for example those over 45 years of age, smokers and heavy drinkers, those suffering from chronic respiratory or kidney disease, and people whose immune system is impaired. Infection can also cause less serious illnesses which are not fatal or permanently debilitating but which can affect all people. All outbreaks of the disease are avoidable if simple precautions are taken.

2.2 The incubation period ranges between two and ten days and usually begins with a headache, muscular pain and a general feeling of unwellness. These symptoms are followed by high fever and shaking chills. Nausea, vomiting and diarrhoea may occur. On the second or third day dry coughing develops and is often accompanied by breathing difficulties. Effective treatment may be achieved by the use of antibiotics.



Legionella Bacterium

2.3 Infection is attributed to inhaling Legionellae, either in water droplets which are small enough to penetrate deeply into the lung, or in droplet nuclei (the particles left after the water has evaporated). Legionellae are common in natural sources of water such as rivers and ponds. They may enter man-made systems or water services, where they can multiply under certain conditions and, if there is a means of creating and transmitting water droplets, people in the vicinity may be at risk. Most cases and outbreaks of Legionellosis have been attributed to water services in buildings, cooling towers and whirlpool spas. Other sources have been identified in foreign outbreaks including a humidification system, industrial coolants and respiratory therapy equipment.

3. SUSCEPTIBLE WATER SYSTEMS

3.1 Although not an exhaustive list, the following systems present a potential risk for exposure to the Legionella bacteria:

- a. Cooling towers
- b. Evaporative condensers
- c. Hot and cold water services

- d. Showers and or emergency showers
- e. Eye wash sprays
- f. Sprinklers and hose reel systems
- g. Lathes and machine tool coolant systems
- h. Spa baths and pools in which warm water is deliberately agitated and recirculated
- i. Vehicle wash systems
- j. Fountains and water features
- k. Dental equipment

4. KEY PERSONNEL – ROLES AND RESPONSIBILITIES

4.1 HEAD OF ESTABLISHMENT

4.1.1 The Head of Establishment (HoE) or Commanding Officer (CO) shall undertake the duties of the “Duty Holder” and appoint a person to take day-to-day responsibility for controlling any identified risk from legionella bacteria. Having made the appointments the HoE is to have in place suitable and sufficient monitoring regimes to ensure that their responsibilities are being discharged.

4.2 DUTY HOLDER

4.2.1 The Duty Holder should have access to competent advice/assistance regarding the risks of exposure to legionella in the water systems present on the premises and the necessary control measures. Prior to the employment of contractors, HoE/CO's should make reasonable enquires to satisfy themselves of their competency in the area of work before entering into contracts for the treatment, monitoring and cleaning of water systems or other aspects of water treatment and control.

4.2.2 The Approved Code of Practice (ACoP) L8 requires the duty holder to appoint a “Responsible Person” to take responsibility for the day-to-day management of the water systems. This person shall be hereafter referred to as the “Responsible Person”, and must be appointed in writing.

4.2.3 The employment of contractors or consultants to implement the necessary controls to prevent the proliferation of legionella bacteria can be implemented, but the responsible person must ensure they are competent to undertake the tasks required.

4.3 DUTY HOLDER WHERE REGIONAL PRIME CONTRACT (RPC) ARE THE MAINTENANCE MANAGEMENT ORGANISATION (MMO)

4.3.1 Where Defence Estates Regional Prime Contract is in place the DE DDEM will on behalf of the HoE/CO undertake the management tasks for, and on behalf of the Duty Holder for water systems which fall within the scope of the RPC; the HoE/CO will be required to formally instruct in writing the DE DDEM to act on his behalf.

4.3.2 In all other circumstances (for works outside the scope of RPC) the HoE/CO will undertake the duties of the Duty Holder, appoint a responsible person within their area of responsibility, and also have in place suitable and sufficient monitoring regimes to ensure that these responsibilities are being discharged.

4.4 RESPONSIBLE PERSON

4.4.1 The “Responsible Person” should be a director or a manager and shall have sufficient authority to act on behalf of the duty holder, be competent and possess sufficient knowledge of the installation to ensure that all operational procedures are carried out in a timely and effective manner.

4.4.2 The “Responsible Person” shall ensure that a suitable and sufficient assessment is conducted in order to identify and assess the risk of exposure to legionella from work activities and water systems on the premises under the control of the HoE/CO, and any necessary precautionary measures required to reduce the risk of exposure to as low as reasonably practicable.

4.4.3 The “Responsible Person” is to ensure that organisations such as water treatment companies or consultants together with MOD staff are competent and suitably trained, and have the necessary equipment to enable them to carry out their duties in a safe and proper manner.

4.5 EMPLOYEES

4.5.1 All water system operators and maintenance staff should take reasonable care of themselves and conduct their duties safely by following the instructions and training provided.

5. COMPETENCIES (INFORMATION, INSTRUCTION AND TRAINING)

5.1 Those who are appointed to carry out the control measures and strategies should be suitably informed, instructed and trained and have their suitability assessed. They should be trained to a standard which ensures that tasks are carried out in a technically safe and competent manner. Competence is dependent on the needs of the situation and the nature of the risks involved. To maintain competence periodic refresher training should be provided and records maintained of all training undertaken. Although training is an essential element of competence, experience, knowledge and other personal qualities are needed to undertake their role safely.

5.2 All personnel required to assess risk and apply controls must be competent, adequately trained and aware of their responsibilities. Water system operatives and maintenance staff must also be suitably trained to ensure that their tasks are conducted in a technically competent manner.

5.3 Refresher training should be provided at intervals not exceeding two years. If there is a significant change/modification to the system or written procedures, appropriate training must be provided immediately with adequate supervisory support.

6. BUILDING SERVICES

6.1 In the majority of Establishments, the control of legionella in hot and cold water services will be managed by the Maintenance Management Organisation (MMO), in these cases the “Responsible Person” will need to ensure that adequate communication chains are established and the appropriate control measures applied. The procedures applied to building services are identified in ACOP L8.

7. RECORD KEEPING - THE RESPONSIBLE PERSON

7.1 The “Responsible Person” shall ensure that appropriate records are kept, including:

- a. Details of the persons responsible for managing, conducting the risk assessments and implementing a written scheme.
- b. The significant findings of the risk assessments and any remedial action taken.
- c. The written scheme required for controlling the risk to exposure and details of its implementation.
- d. The dates and results of any monitoring, inspections, tests or checks carried out, including information as to whether the system is in operation or not.
- e. Calibration certification of temperature measurement equipment used.

7.2 The above mentioned records should be retained for a minimum of five years.

8. THE RISK ASSESSMENT PROCESS

8.1 Hazard identification as part of the risk assessment process (see Leaflet 39 – Health and Safety Risk Assessment for guidance) should identify the need for an assessment of risk from exposure to Legionella associated with work activities and water systems on the premises, including any necessary control measures. The assessment should include:

- a. Identification and evaluation of potential sources of risk.
- b. The particular means by which exposure to legionella is to be prevented, or
- c. If prevention is not reasonably practicable, the particular means by which the risk of exposure from legionella is to be controlled.

8.2 Where the risk assessment demonstrates that there is no reasonably foreseeable risk or that the risks are insignificant and unlikely to increase, no further assessment or measures are necessary. However, should the situation change, the risk assessment must be reviewed and any necessary control measures implemented.

8.3 The risk assessment must be reviewed every two years (as a maximum) or earlier if there is reason to believe that the original assessment is no longer valid

8.4 UNDERTAKING A RISK ASSESSMENT

8.4.1 A number of factors are required to create a risk of exposure to Legionellosis, these include:

- a. The presence of Legionella bacteria.
- b. Conditions suitable for multiplication of the organisms to high numbers (e.g. a suitable temperature (20°C to 45°C) and a source of nutrients e.g. sludge, scale, rust, algae and other organic matter).
- c. A means of creating and disseminating breathable droplets (e.g. the aerosol generated by a cooling tower or shower).
- d. The presence of susceptible individuals (e.g. young children, the elderly and infirm, heavy smokers, people with chest disorders).

8.4.2 The individual nature of each site and systems needs to be considered when conducting a risk assessment.

8.4.3 The first step should be to produce a site survey listing all water systems in use, including a register of all associated plant, pumps, strainers and other relevant items. This should then be combined with an up-to-date plan(s) showing the layout of the plant or water systems including any sections which may be temporarily out of use.

8.4.4 Once the register of assets and plan(s) has been completed, the parts of the water system that pose a risk can be identified, i.e. where Legionella may proliferate and be disseminated throughout the network.

8.4.5 Below is a list of factors that need to be considered when conducting the risk assessment:

- a. The source of the water supply, i.e. mains supply or direct supply from a bore hole.
- b. Possible sources of contamination to the supply water before it reaches the supply point.
- c. The normal plant operating characteristics.
- d. Large storage tanks and their configuration.
- e. Unusual, but reasonably foreseeable operating conditions, e.g. breakdowns.
- f. Specific Risk Assessments should be completed for any processes involving the use of cleaning reagents covered by the Control of Substances Hazardous to Health Regulations (COSHH) or where any procedure might, if adequate precautions were not taken, expose staff to infection.
- g. Appropriate protective clothing and respiratory protection must be provided.
- h. All affected water outlets must be labelled during chemical disinfection and notices displayed at the entrance to buildings. Appropriate precautions and notices should be provided during thermal disinfection.
- i. If procedures will involve the interruption of drinking water or the supply of water to sanitary facilities etc. provision should be made for the staff working in the area.

8.5 A Legionella risk assessment flowchart can be found at Annex A.

9. CONTROL MEASURES

9.1 The risk from exposure to will normally be controlled by implementing measures to prevent the proliferation of Legionella bacteria in the system and reduction of exposure to water droplets and aerosol.

9.2 Precautions should, where appropriate, include the following:

- a. Control of the release of water spray.
- b. Avoidance of water temperatures between 20°C and 45°C.
- c. Avoidance of water stagnation.
- d. Maintaining the cleanliness of the system and the water in it.

- e. Only utilising approved materials in the construction and maintenance of the water system.
- f. Ensuring that the system is operated correctly, safely and is kept well maintained.
- g. Implementing a suitable water treatment regime where appropriate and ensuring it is carried out.
- h. Ensuring that a flushing regime is implemented especially when there is transient occupancy.

9.3 If precautions are to remain effective, the condition and performance of the system will need to be monitored. This should be the responsibility of the “Responsible Person” who shall ensure that monitoring is undertaken in accordance with the written scheme.

9.4 RECORD KEEPING - CONTROL MEASURES

9.4.1 To ensure that the necessary control measures continue to be applied and that adequate information is available, a record of the assessments, precautionary measures and treatments should be kept.

9.4.2 The following information should be kept:

- a. Details of the “Responsible Person” who has been appointed by the “Duty Holder” for ensuring that all measures required for the Control of Legionella are implemented.
- b. A risk assessment together with the written action plan and control measures.
- c. Plans or schematic drawings of the water system.
- d. Details of the precautionary measures that have been implemented.
- e. Details of any remedial works conducted on the water system and the date of completion.
- f. A log detailing visits by contractors, consultants and other personnel.
- g. Cleaning and disinfecting procedures together with associated reports and certificates.
- h. Water analysis and test reports.
- i. Cooling tower notification details.
- j. Personnel training records.

- k. The name and position of the person(s), who have responsibilities for implementing the written scheme, what their respective responsibilities are and their lines of communication.
- l. Records showing the current state of the water system.
- m. The signature of the person carrying out the task, or other form of authentication, where appropriate.
- n. List of locations for all Temperature Maintaining Valves (TMV) installed with appropriate temperature records.
- o. Calibration certificates of temperature measurement equipment used.
- p. Action plan for any remedial work identified during the assessment process or inspections.
- q. Records of remedial works carried out are to be recorded for traceability.

9.5 MONITORING – Control Measures

9.5.1 In order to ensure the continued success of a water treatment programme, both the system and make-up water should be routinely tested to determine its composition. For the majority of water systems the contracted MMO will conduct this activity.

9.5.2 Detailed in Table 1 are the typical on-site monitoring checks recommended for good operating practice.

Table 1

Parameter	Timing	
	Make-Up Water	Cooling Water
Calcium hardness as mg/l CaCO ₃	Monthly	Monthly
Magnesium hardness as mg/l CaCO ₃	Monthly	Monthly
Total hardness as mg/l CaCO ₃	Monthly	Monthly
Total alkalinity as mg/l CaCO ₃	Quarterly	Quarterly
Chloride as mg/l Cl	Monthly	Monthly
Sulphate as mg/l SO ₄	Quarterly	Quarterly
Conductivity μ s (Total dissolved solids)	Monthly	Weekly
Suspended Solids mg/l	Quarterly	Quarterly

Inhibitor(s) level mg/l	-	Monthly
Oxidising biocide mg/l	-	Weekly
Temperature °C	-	Quarterly
pH	Quarterly	Weekly
Soluble Iron as mg/l Fe	Quarterly	Quarterly
Total Iron as mg/l Fe	Quarterly	Quarterly
Concentration Factor	-	Monthly
Microbiological Activity	Quarterly	Weekly
Legionella	-	Quarterly

9.5.3 Routine analysis should be conducted at least monthly.

10. EMPLOYING CONTRACTORS AND CONSULTANTS

10.1 The employment of contractors or consultants does not absolve the:

- a. HoE/CO of responsibility for ensuring that plant operational procedures are carried out to the standard required to prevent the proliferation of legionella.
- b. HoE/CO of satisfying themselves of the competence of the contractors in the area of work before gaining their assistance in treating, monitoring and cleaning the water system and other aspects of water treatment and control.
- c. Contracted MMO for ensuring that they are adequately resourced and have appropriately trained individuals to undertake the role of a competent service provider in support of the 'Responsible Person'

11. IN THE EVENT OF AN OUTBREAK OF LEGIONELLOSIS

11.1 Cases of Legionellosis are reportable under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). A confirmed case of Legionellosis (i.e. by a GP or medical practitioner's note) must be reported by the employer in accordance with procedures.

11.2 Where the above applies to a member of staff or contractor working on the Establishment then the incident must be reported as follows:

- a. On receipt of the GP or medical practitioner's note confirming a case of Legionellosis the line manager is to report the incident to the RIDDOR Incident Contact Centre.
- b. Where there is a confirmed case of Legionellosis reported to the Establishment H&S/SHEF Advisor, details of where the person works etc. should be passed to the Duty Holder and Responsible Person.

- c. In all instances where a confirmed case is reported to the Responsible Person the MMO's Health and Safety Representative (i.e. H&S manager) is to carry out a detailed investigation along with the Establishment H&S Representative where applicable.

12. RELATED DOCUMENTS

12.1 Further information can be found in the following publications (it is essential that the latest publication/edition of any document is consulted):

JSP 375 Volume 2:

- a. Leaflet 5 – Substances Hazardous to Health
- b. Leaflet 39 – Health and Safety Risk Assessment
- c. Leaflet 46 – Notifying and Recording of Accidents, Injuries, Diseases and Dangerous Occurrences: Procedures

Guidance and Legislation

- a. "Legionnaires' disease: The Control of legionella bacteria in water systems." Health and Safety Commission (HSC) ACOP L8 – Approved Code of Practice & Guidance.
- b. "Legionnaires' disease: A guide for employers." HSE guidance note IAC27.
- c. "Minimising the risk of Legionnaires' disease." The Chartered Institution of Building Services Engineers, Technical Memorandum TM13.

Industry Code of Conduct:

An industry Code of Conduct for organisations providing water treatment services has been jointly developed by the British Association of Chemical Specialities (BACS) and the Water Management Society (WMS). Although the Code of Conduct has no legal status, it does provide a degree of assurance about the standards of service that should be provided to customers. A copy of the Code of Conduct can be obtained from The Water Management Society, Mill House, Tolson's Mill, Fazeley, Tamworth B78 3QB.

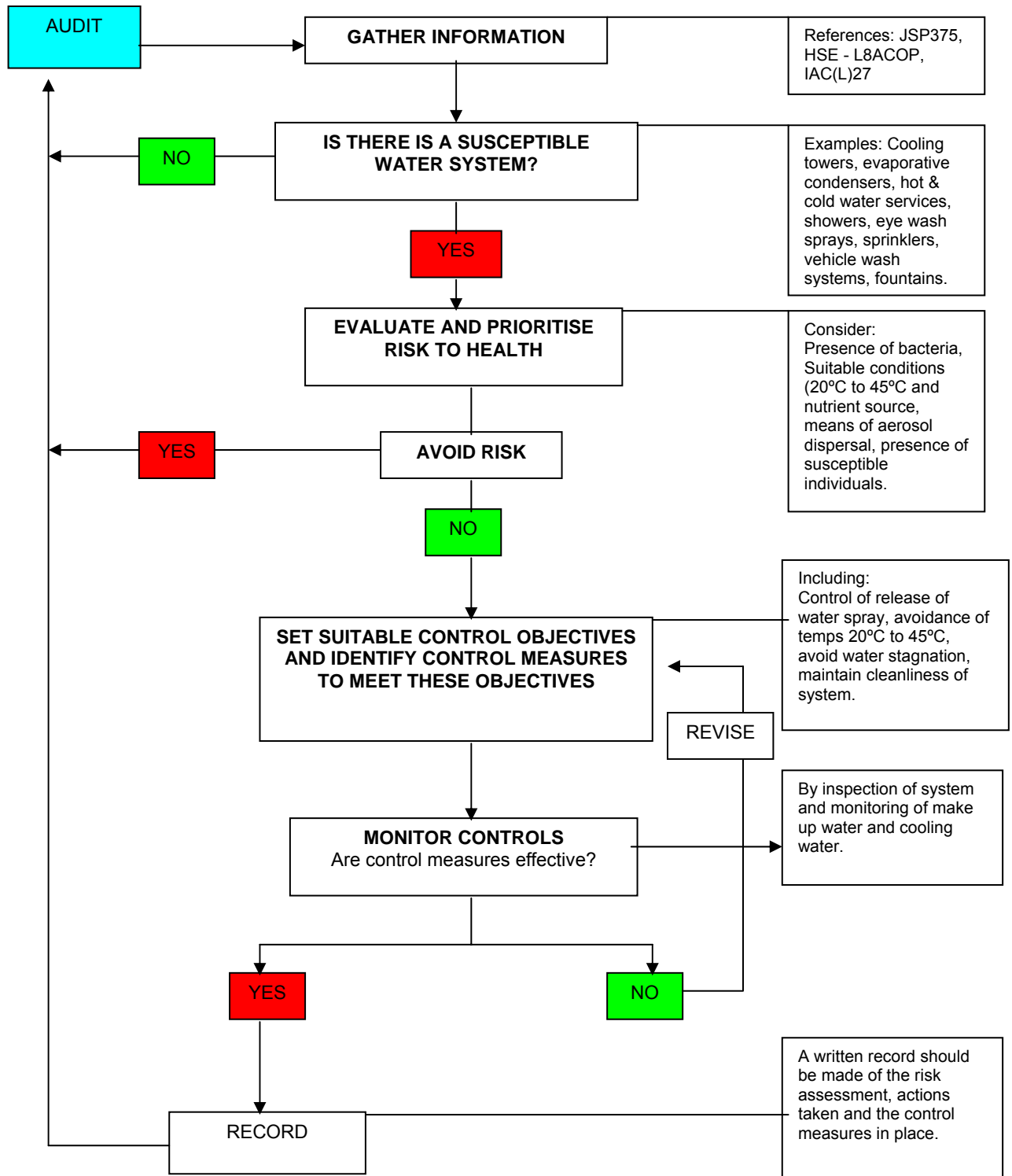
Legionella Management Plan

A "Legionella Management Plan Template" (implemented throughout RPC contracts) is attached at Annex B.

13. DEFINITIONS

Legionnaires' disease	A type of pneumonia caused by bacteria and commonly associated with water systems.
Legionellosis	Term used for infections caused by legionella pneumophila and other similar bacteria
Head of Establishment	The most senior MOD person identified, by the chain of command, as responsible for the site, establishment, base or building.
Commanding Officer	The most senior Service person identified, by the chain of command, as responsible for the site, establishment, base or building.
The Responsible Person	The "Responsible Person" should be a director or a manager and shall have sufficient authority to act on behalf of the Duty Holder.
The Duty Holder	The Head of Establishment (HoE) shall undertake the duties of the "Duty holder" and appoint a person to take day-to-day responsibility for controlling any identified risk from legionella bacteria
The MMO	The organisation responsible for planning, organising and managing the operation, maintenance and repair of equipment and which may include the design and construction of new works. The MMO may be a Contractor, DE or Military personnel

LEAFLET 19
LEGIONELLA RISK ASSESSMENT FLOWCHART





Management Plan for the Control of Legionella Bacteria In Water Systems at {enter name of Establishment}

ISSUE REGISTER

WHEN THE COMPLETE DOCUMENT IS RE-ISSUED, THE BRIEF DETAILS REQUIRED BELOW ARE TO BE COMPLETED.

ISSUE NUMBER	RECIPIENT
1	
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AMENDMENT RECORD

WHEN AN AMENDMENT IS INCORPORATED, THE BRIEF DETAILS REQUIRED BELOW ARE TO BE COMPLETED.

Amdt Number	Paragraph Number Where Text Has Changed Brief summary of alteration	Signature Date
1		
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1. Approval of Legionella Management Plan

This Legionella Management Plan (LMP) has been prepared to satisfy the requirements of reference B.

The LMP describes the management arrangements which are in place to control the risks of proliferation of legionnaires bacteria in water systems at {enter name of Establishment}.

This LMP was prepared on behalf of the Duty holder by _____ and is subject to periodic review.

APPROVAL AND AUTHORISATION

TITLE LEGIONELLA MANAGEMENT PLAN FOR {enter name of Establishment}.

ISSUE NUMBER

DATED

THE CONTENT AND FORMAT OF THIS LEGIONELLA MANAGEMENT PLAN ARE AGREED AND AUTHORISED BY:

_____ on behalf of the Duty Holder.

Name

Signature

Date

2. References

- A HSE - Legionnaires Disease – The Control of Legionella bacteria in water systems – L8
- C JSP 375 – MOD Health and Safety Manual

3. Introduction

The Approved Code of Practice and Guidance entitled Legionnaires ' disease - The control of legionella bacteria in water systems (commonly referred to simply as L8) was approved by the Health and Safety Commission (HSC) in November 2000 and became effective on the 8th January 2001. L8 gives practical guidance with respect to sections 2, 3, 4 and 6 of the Health and Safety at Work etc. Act 1974 and regulations 7, 7, 8, 9 and 12 of the Control of Substances Hazardous to Health Regulations 2002.

This document forms the Management Plan adopted by _____ at {enter name of establishment}, in order to comply with its responsibilities to control the proliferation of legionella bacteria in water systems within assets under their control. It **must** be adhered to by all staff, Contractors (inc Supply Chain) and persons charged with the responsibility for water systems.

Where Defence Estates Regional Prime Contract is in place the DE FM will undertake the duties of the Duty Holder for water systems which fall within the scope of the RPC; the HoE is to formally appoint the DEFM as the Duty Holder. In all other circumstances (for works outside the scope of RPC) the HoE will undertake the duties of the Duty Holder, appoint a responsible person within their area of responsibility, and also have in place suitable and sufficient monitoring regimes to ensure that these responsibilities are being discharged.

The key requirements of the above are as follows:

- Competent persons to be appointed to monitor and audit the implementation of the controls
- Detailed risk assessment of all water systems to include schematic plans of the system
- Written Scheme to be drawn up from the risk assessment identifying adequate controls
- Maintenance regime to be put in place to implement the controls
- Adequate records to be retained
- Carry out regular reviews
- Employ suitably trained & experienced persons to carry out monitoring and testing.

The purpose of this management plan is to ensure that all management staff is aware of their responsibilities and to provide guidance on the requirements.

4. Appointments / Contact Details

Under the terms of L8 the following appointments have been made:

Duty Holder. The duty holder for Establishments is the Head of Establishment (HoE). The Duty Holder has delegated the day to day site specific duties to the _____:

{enter name and contact details}

Responsible Person. The duty holder has appointed _____ as the Responsible Person. The day to day site specific duties will be undertaken by:

{enter name and contact details}

The _____ is also the **Responsible Person**.

The _____ has appointed a **Deputy Responsible** Person to assist him in the day to day site specific duties of the Responsible Person/Authorised Person. The Deputy Responsible Person/Appointed Person is:

{enter name and contact details}

The following personnel are deemed to be sufficiently trained to conduct reviews of the site systems when there are changes to these systems resulting from new works or maintenance activities and periodically monitoring the implementation of the controls specified in the Written Scheme:

{list names}

Cluster Leaders (RPC Contracts). The supply Chain Cluster Leaders are responsible for implementing the controls detailed within the Written Scheme. The Cluster Leader for this Establishment is:

{enter name and contact details}

Site Estate Representative/Building Custodian. The Site Estate Representative/Building Custodian is responsible for informing the Responsible Person of little used outlets that require flushing on a weekly basis which are under their control:

{enter name and contact details}

5. Policy Statement

To follow the guidelines given in ACOP L8 by the Health and Safety Commission (HSC) to manage the water systems, such that conditions under which legionella can

proliferate are designed out of systems and control of water temperatures is the main control measure for the prevention of legionellosis. Good system design, good maintenance and proactive management of water temperatures to prevent the proliferation of legionella within premises are the primary aims of the Management Plan. Regular weekly / monthly / quarterly / annual checks of water temperatures and systems to comply with ACOP L8 are to be undertaken by the Cluster Leader. The building custodian is responsible for informing the Cluster Leader of little used outlets that require flushing on a weekly basis. Routine monthly inspections and two-yearly updates to the site Risk Assessment are to be made by the Responsible Person or by a specialist contractor employed by _____.

{It is considered that there are no vulnerable persons employed at the establishments that necessitate additional legionella monitoring by a specialist contractor. Amend this paragraph to be site specific. Consider locations where there is an increased likelihood of the presence of vulnerable persons such as medical facilities and places where there is access to the general public.}

6. Means Of Compliance With The Management Plan

Risk Assessment. The current assessment/s were undertaken by {enter details} in {enter date}. These assessments are held by the MMO at his office at {enter office details}. The MMO is to ensure that it is reviewed at two yearly intervals. *{Note there may be a clash with the requirements of Schedule B and therefore until agreed otherwise we will conduct the review in accordance with the greater control.}*

Written Scheme. This is contained in the risk assessment. The recommended physical changes to the systems were completed in [DATE} and consisted of the decommissioning of cold water tanks to reduce the stored water on site together with minor works to the remaining tanks to bring them in line with the recommendations within ACOP L8. Finally the remaining tanks were cleaned and chlorinated. Primary means of controlling legionella growth is by temperature.

Monitoring and Checking. Assets will have a site management BSRIA log book or equivalent wherein details of checks required will be listed and have log sheets for the recording of the checks.

The Cluster Leader shall arrange for competent site personnel to inspect tanks / check water temperatures and bacteria levels, etc. to comply with ACOP L8 and will countersign that the regular inspections have been completed.

Water temperature and bacteria level checking will be at outlets only to ensure that they are within ACOP L8 guideline parameters.

The MMO in conjunction with the building custodians / Site Estate Representative are to ensure that flushing regimes for little used outlets are undertaken as required and will countersign that the regular inspections have been completed.

The log books will be inspected by the MMO on a quarterly basis to ensure completion in accordance with the Written Scheme.

After major works or if biannual reviews identify that the current assessment is no longer valid the MMO will instigate a new assessment, this will include drawings etc and informing the Cluster Leader and SER where appropriate.

Where free-standing drinking water supplies using bottled water are provided, these are not covered by the risk assessment.

Staff will be given sufficient training to enable them to perform their duties with regard to legionella. Refresher training will be given when appropriate.

The Responsible Person will carry out Contractor Competency checks as required.

7. Roles and Responsibilities

Head of Establishment

The HoE shall undertake the duties of the “Duty holder” and appoint a person to take day to-day responsibility for controlling any identified risk from Legionella bacteria. Having made the appointments the HoE is to undertake reasonable checks and seek assurances from the duty holder that management systems are in place and are being monitored.

Appointment of Duty Holder

Where Defence Estates Regional Prime Contract is in place the DE DDEM will on behalf of the HoE undertake the management tasks for, and on behalf of the Duty Holder for water systems which fall within the scope of the RPC; the HoE will be required to formally instruct in writing the DE DDEM to act on his behalf.

In all other circumstances (for works outside the scope of RPC) the HoE will undertake the duties of the Duty Holder, appoint a responsible person within their area of responsibility, and also have in place suitable and sufficient monitoring regimes to ensure that these responsibilities are being discharged.

The duty holder should have access to competent advice/assistance regarding the risks of exposure to Legionella in the water systems present on the premises and the necessary control measures. Prior to the employment of contractors, organizations should make reasonable enquires to satisfy themselves of their competency in the area of work before entering into contracts for the treatment, monitoring and cleaning of water systems or other aspects of water treatment and control.

The person appointed by the duty holder, known as the “Appointed Person” shall be a ‘responsible person’ and have sufficient authority to act on behalf of the duty holder, be competent and possess knowledge of the installation to ensure that all operational procedures are carried out in a timely and effective manner.

The employment of contractors or consultants does not absolve the duty holder of the responsibility for ensuring that control procedures are carried out to the standard required to prevent the proliferation of Legionella bacteria.

Responsible Person

The Responsible Person is specifically charged in line with guidance in ACOP L8 to:

- Ensure that the risk assessment reviews are carried out & are suitable and sufficient.
- Monitor and order surveys etc. from specialist contractors to ensure the Risk Assessment and Written Scheme remains current.
- Provide advice to the Duty Holder and Establishment on Legionella matters as and when required.
- Upon receipt of the Legionella survey and Risk Assessment check for and process any items which require immediate action to be undertaken and prioritise and programme any other remaining remedial works.
- Assess the competence of those undertaking any works on their behalf.
- Review and update the Management Plan to take into account changes in legislation and changes in management.
- Routine monitoring of log books to ensure compliance with L8.
- Ensure that planned works for which they are responsible take into account the requirements of ACOP L8 such that conditions that encourage the proliferation of legionella do not exist and that the works comply with any water authority local conditions or requirements, and seeking advice where necessary.
- Ensure that designs take into account the guidelines in ACOP L8.
- Instruct the Cluster Leader (RPC Sites) to carry out weekly flushing of little used outlets as directed by the Site Estate Representative/Building Custodian.
- Liaise with the Site Estate Representative/Building Custodians and Cluster Leader where remedial works necessitate the removal from service of a system or part of a system.

Maintenance Management Organisation (MMO)

- **Regional Prime Contractor (RPC):** The Maintenance Management Organisation that has been allocated responsibility for the maintenance of a specific geographical area.

- **Non RPC:** The organisation responsible for planning, organising and managing the operation, maintenance and repair of equipment, which may include the design and construction of new works.

The Cluster Leader (RPC Contacts)

The Cluster Leader is specifically charged with:

- Being a point of contact for reports of problems with temperature control / foreign bodies etc. in water systems and arranging requisite remedial action.
- Being responsible for implementing and maintaining log books in accordance with BISRIA Application Guides AG 19/2000, AG 20/2000, AG 21/2000 & AG 4/1994.
- Ensuring that each site is compliant with ACOP L8 and to countersign the log and to give advice as required
- Ensuring that all companies used for legionella works, routine monitoring, testing and sampling are competent and have the appropriate insurance and accreditation from certification bodies.
- Ensuring that all materials and stores used in water systems comply with the WRC Water Fittings & Materials Directory.
- Immediately reporting to the MMO any problems identified with a system that may necessitate the system or any part of the system being closed down for remedial works.
- Reporting problems found whilst making site visits and ensuring timely remedial work for items classed as high risk is put in hand as soon as possible, with other items deemed as lower risk reported to the Responsible Person/Appointed Person.
- Advising any changes to the water systems to enable the risk assessment / written scheme to be updated accordingly.
- Advising on appropriate training.
- Ensuring that planned works for which they are responsible take into account the requirements of ACOP L8 such that conditions that encourage the proliferation of legionella do not exist and that the works comply with any water authority local conditions or requirements, and seeking advice where necessary.
- Ensuring that designs take into account the guidelines in ACOP L8 and that appropriate test and disinfection certificates are provided by the contractors.

- Ensuring in conjunction with the Site Estate Representative/Building Custodians that flushing regimes for little used outlets is undertaken and will countersign that the regular inspections have been completed.

Site Estate Representative/Building Custodian

The Site Estate Representative/Building Custodian are to ensure that the MMO be informed of little used outlets that require flushing on a weekly basis, or undertake the tasks of flushing little used outlets for buildings which they are responsible for.

Designers

Designers are to ensure that:

- Planned works for which they are responsible take into account the requirements of ACOP L8 such that conditions that encourage the proliferation of legionella do not exist and that the works comply with any water authority local conditions or requirements, and seeking advice where necessary.
- Materials specified comply with the Water Supply and Fittings Regulations 1999.
- Designs take into account the guidelines in ACOP L8 and that appropriate test and disinfection certificates are provided by the contractors.

General Contractors and sub-contractors

General Contractors and sub-contractors are specifically charged with:

- Ensuring that new works or modifications to existing systems are installed such that conditions that encourage the proliferation of legionella do not exist and that the Works comply with any water authority local conditions or requirements.
- Ensure that all materials used are compliant with the Water Supply and Fittings Regulations 1999.
- Providing certificates of chlorination for modifications/ new works as required by the works specification.

8. Emergency Procedures

System operating outside of its parameters

In the first instance all cases are to be brought to the “Responsible/Appointed Person teams” attention as soon as possible. They will make the decision on whether any further action, if any, is required, including informing the H&S department. These actions could consist of; a re-test, checking with a “Bio-scan” unit to give a snapshot of the level of bacteria in the system, shutting down the system and informing the client that they need to evacuate the building until the level of threat is established. The

follow up actions might require cleaning and disinfection of the system. Details of acceptable cleaning and disinfection procedures are contained in paragraphs 190 – 196 of ACOP L8.

Action in the event of an outbreak

Full details relating to the action in event of an outbreak is given in Appendix 2 to reference A. The following is a brief extract.

An outbreak is defined by the Public Health Laboratory Service (PHLS) as two or more confirmed cases of legionellosis occurring in the same locality within a six-month period. Location is defined in terms of the geographical proximity of the cases and requires a degree of judgement. It is the responsibility of the Proper Officer for the declaration of an outbreak. The Proper Officer is appointed by the local authority under public health legislation and is usually a Consultant in Communicable Disease Control.

Local authorities will have established incident plans to investigate major outbreaks of infectious disease including Legionellosis. These are activated by the Proper Officer who invokes an Outbreak Committee, whose primary purpose is to protect public health and prevent further infection. This will normally be set up to manage the incident and will involve representatives of all the agencies involved. HSE or the local authority EHO may be involved in the investigation of outbreaks, their aim being to pursue compliance with health and safety legislation.

The local authority, CCDC or EHO acting on their behalf (often with the relevant officer from the enforcing authorities – either HSE or the local authority) may make a site visit.

As part of the outbreak investigation and control, the following requests and recommendations may be made by the enforcing authority.

- To shut down any processes which are capable of generating and disseminating airborne water droplets and keep them shut down until sampling procedures and any remedial cleaning or other work has been done. Final clearance to restart the system may be required.
- To take water samples from the system before any emergency disinfection being undertaken. This will help the investigation of the cause of the illness. The investigating officers from the local authority/ies may take samples or require them to be taken.
- To provide staff health records to discern whether there are any further undiagnosed cases of illness and to help prepare case histories of the people affected.
- To co-operate fully in an investigation of any plant that may be suspected of being involved in the cause of the outbreak. This may involve, for example:
 - tracing of all pipework runs;
 - detailed scrutiny of all operational records;
 - statements from plant operatives and managers;
 - statements from water treatment contractors or consultants.

If a water system is implicated in an outbreak of Legionnaires' disease, emergency treatment of that system should be carried out as soon as possible. A detailed

breakdown of the specific actions to be taken relevant to the system is given in reference A.

Any infringements of relevant legislation may be subject to a formal investigation by the appropriate enforcing authority.

On notification by the Enforcing Authority that a system has been implicated in an outbreak:

The Responsible Person/Appointed Person is to:

- Notify the Duty Holder.
- Inform the SER immediately.
- Notify the *SHEF/GHSA. * *delete as appropriate*
- Advise on remedial action including any need for evacuation.
- Seal off affected areas and erect warning notices if necessary.
- Engage a competent contractor to carry out remedial works if necessary.

The SER is to:

- Notify the DE FM/DE RM if necessary (RPC Contract)
- Inform the Responsible Person
- Arrange for the MMO to carry out remedial actions as specified in reference A or by the Enforcing Authority.
- Ensure that any work in that area, likely to increase the risk of exposure, ceases.
- Arrange for the area to be evacuated, sealed and warning notices displayed, if there is a significant risk of exposure to water droplets or mist etc.

The Building Custodian is to:

- Co-operate with the SER and arrange evacuation of the building and affected areas if necessary.

The *SHEF/GHSA is to investigate in accordance with the Establishment Health Safety and Environment manual if appropriate.

9. Reporting and Action to be taken following a Confirmed Case of Legionellosis

Cases of legionellosis are reportable under RIDDOR (Reporting of Injuries, Diseases and dangerous Occurrences Regulations 1995). Where a case of legionellosis is confirmed by a doctor's note the employer will be required to report the incident in accordance with their internal procedures.

Where the above applies to a member of staff or contractor working on the Establishment then the incident must be reported as follows:

The line manager is to report to the RIDDOR Incident Contact Centre on receipt of the Doctor's note confirming a case of Legionellosis.

Where there is a confirmed case of Legionellosis reported to the Establishment H&S Advisor/SHEF, details of where the person works etc. should be passed to the Duty Holder and Responsible Person.

In all instances where a confirmed case is reported to the Responsible/Appointed Person the MMO Health and safety manager is to carry out a detailed investigation along with the Establishment H&S Representative where applicable.

The Responsible/Appointed Person is to:

Gather and retain all records associated with the systems where the affected person could have been infected and retain these should there be another confirmed case in the area. See section 9 on outbreaks.

Where necessary carry out the actions described in section 9 under "System operating outside of its parameters"

10. Record Keeping

Accurate and comprehensive records are essential in order to demonstrate that due diligence and reasonable precautions have been put in place in order to avoid non-compliance with the regulations.

All legionella related documents arising from activities will be retained and controlled by the "Responsible/Appointed Person" in order to fulfil the above requirements.

The following to be formally recorded

- Names of people responsible for carrying out various tasks under the written scheme
- A Risk Assessment and written scheme of action and control measures
- Plans or schematic drawings of the system
- Details of precautionary measures carried out including dates and evidence to suggest that these have been carried out correctly
- Remedial work required and carried out including dates
- Log detailing visits by contractors consultants and other personnel
- Cleaning and disinfection
- Results of analysis of water samples
- Training records of personnel
- Name and position of people or persons who have responsibilities for implementing the scheme, their respective responsibilities and their lines of communication
- Current state of operation of the system
- Signature of the person carrying out the work where appropriate.

- Calibration certification of temperature measurement equipment used.

Records to be retained for at least five years

Day to Day document control see annex A.

11. Document Review

This document will be reviewed annually, or whenever a change to legislation relating to the control of legionella is enacted.

Appendix A - LEGIONELLA DOCUMENT CONTROL PROCESS

The following process will be adhered to, to ensure all documentation related to the control of legionella in accordance with ACOP L8 is correctly recorded and stored for audit purposes:

1. The Planned Preventative Maintenance (PPM) dockets for all programmed tasks will be generated on the scheduled date and issued to the MMO for water treatment.
2. On completion the docket will be filled in along with any associated report sheets, and these will be cross referenced to each other by recording the sheet and docket numbers on each document.
3. The docket and report sheet will be returned to the issuing office for retention and filing in the relevant building logbook.
4. Where a docket/report sheet indicates that a temperature etc is out of specification, then this is to be entered on to a non-compliance sheet to be held in a separate file within the office PPM filing system.
5. The non-compliance sheet will have a column to record the remedial works order raised to rectify the out of specification asset/system, and also a column to sign this work off as completed once undertaken by the maintenance engineer.
6. If the non-compliance is a previously identified problem e.g. a rectification requirement highlighted in the site risk assessment; then providing there is a programmed remedial action plan in place to undertake the work, the non-compliance sheet can be annotated and signed to that effect.
7. In the event that the non-compliance is judged to be an isolated case e.g. low temperature due to recent draw on the storage vessel etc, then where both the supervisor and engineer agree, the non-compliance can be signed off as “no immediate action to be taken but will monitor against next result(s)”.
8. Where the non-compliance was rectified on the original PPM visit and recorded on the PPM docket, the out of specification occurrence will still be recorded on the non-compliance sheet identifying the PPM docket number and signed off as completed.
9. The recording of the work order number will allow traceability to the work order and any other supporting documentation cross referenced on the completed work order on the docket system.
10. The non-compliance sheet will be issued to the “Responsible/Appointed Person” on a monthly basis for comment and signature of acceptance, and then filed in the non-compliance PPM file; a copy will be left with the RP/AP for his records.

11. The building logbooks, non-compliance file and a copy of the legionella risk assessments for the site will all be held in the location of the SER/Building Custodian filing system.

Appendix B - ADDITIONAL GUIDANCE EXTRACTED FROM L8 and OTHER BEST PRACTICE**1. Codes & Guidance Applicable to Prevention**

- HSE - Approved Code of Practice & Guidance Legionnaires Disease. The Control of Legionella bacteria in water systems.
- UK Health Department HTM 2040
- UK Health Department HTM 2070
- DETR Guidance Document to the Water Regulations
- WRC – Water Fittings & Materials Directory
- CIBSE – TM13 2000. C.o.P Minimising the risk of Legionella
- B.S 6700 Design Specification
- B.S 7592 Method for Legionella Sampling
- B.A.C.S Legionella C.o.P
- The Control of Legionella – A recommended code of conduct for service providers
- IOP Legionella – Good Practice Guide
- BISRA Guide to Legionellosis
 - Risk Assessment
 - Operation & Maintenance
 - Control Log Book

2. Requirements of the Regulations – (Cold Water Systems)

Notification – prior to any work on a water system the person or contractor must inform the relevant authority of the works and must receive the appropriate consent.

No person shall –

- (a) Install water fitting to convey or receive water supplied by the undertakers, or alter, disconnect, or use such a water fitting, etc
- (b) cause, or permit such a water fitting to be installed, disconnected or used; in contravention of any of the provisions of Water Supply Regulations 1999 (Water Fittings).
- (c) use or cause or permit to be connected a fitting that is damaged or worn.
- (d) is likely to cause undue consumption, misuse or contamination of the supplied water.
- (e) the erroneous measurement of the supplied water.

3. Advisory Annotations**STORAGE CISTERNS – CHECKLIST**

- Temperature >20°C – Insulate or prevent heat gain if not.
- To water regulations standards when replaced
- Lids to be fitted in all cases – suitable material
- Insect screens to be fitted to overflows and warning pipes
- Pipe connections to be positioned to allow free circulation (prevent stagnation)
- Where practicable outlets from bottom of cistern

- Facility to drain down >25mm
- Facility to clean without disruption to supply
- Cistern shall be of an appropriate size
- Measure capacity against usage (drop test)
- Bacteriological sample analysis when required
- Annual inspection and if necessary cleaning
- Paints and sealants WRC listed
- Insulation to BS 6700

COLD WATER SERVICES CHECKLIST

- Water filters not to have clear castings, cartridge cleansed/changed regularly
- Appropriate back flow protection device to be fitted at each hose reel, wet riser or sprinkler system branch.
- Hose reels to be discharged safely to drain when tested
- Cold water not to gain more than 2°C above point of entry water temperature.
- If any point of entry water temperature is >25°C, consult water company
- Water softeners, follow manufacturers recommendations
- Cold water outlets, mains or stored (**within 2 mins of full flow opening**) <20°C
- Dead legs removed and piped through
- High usage outlets at end of run
- Suspected low use outlets disconnect or run full flow 5 mins weekly (Temp <20°C).
- Booster sets – twin pump – alternate regularly (at least weekly) or remove one pump and keep clean for breakdown purposes
- Jointing materials, ‘O’ rings, washers, sealants WRC listed when replaced
- Paints, anti-freeze, softening medium, inhibitors, treatment chemical WRC listed when replaced.
- Insulation to BS 6700 where necessary
- Check/adjust flows and pressures at outlets to prevent aerosol generation
- Stop valves operated annually

HOT WATER CHECKLIST

- Pipe work from blending valves not to exceed 2 metres
- Overall length of pipe work from the spur not to exceed 5 metres
- Same restrictions apply to communal blending (showers)
- Drawn-off points must be <6 metres from secondary circulation systems
- Flow temperature from calorifier not to fall below 60°C more than twice in 24 hours (not to exceed 20 mins)
- Minimum temperature anywhere in the circulation pipe work should be not less than 50°C
- Prolonged demand could cause secondary return to drop below 50°C
- In-liners filters, i.e. to show regular maintenance required
- Shower hose as well as shower heads to be immersed in disinfection (1% solution)
- Pressure gauges on hot water vessels source of contamination

HOT WATER SERVICE – CHECK LIST 1

- Flow temperature >60°C
- Return temperature >50°C
- All hot water outlets >50°C within 1 minute
- Avoid long dead legs
- Position high usage fittings at end of run
- Consider local water heater
- Consider pipe sizing
- Consider trace heating
- Re-arrange secondary pipe work
- Low usage outlets to run until temperature stabilised weekly

HOT WATER SERVICES – CHECKLIST 2

- Check usage – remove outlets wherever possible
- Clean and disinfect shower heads and spray tap outlets
- Check /adjust flows and pressures to avoid aerosol generations
- Use fail-safe mixers to avoid scalding
- Washers, sealants, gaskets, WRC listed. Replace as practicable
- Circulating twin pumps arrangements – alternate regularly (1-2 days) or remove one pump and keep clean for breakdown purposes
- No ‘blind’ loops on secondary circuit

HOT WATER SYSTEMS

- Temperature in secondary hot water systems not to exceed 100°C
- Every unvented water heater (except for instantaneous, or secondary coil with a capacity not greater than 15litres) shall:
 - a) be fitted with a temperature control device and either a temperature relief valve or combined temperature and pressure relief valve
 - b) be capable of accommodating expansion within the secondary hot water system
- An expansion valve shall be fitted with provision to ensure that water is discharged in a correct manner in the event of a malfunction of the expansion vessel or system
- Discharges from temperature relieve valves and combined temperature/pressure relief valves shall be made in a safe and conspicuous manner
- No vent pipe from primary circuit shall discharge over a cistern containing wholesome water for domestic purposes or for supplying water to a secondary system
- No vent pipe from a secondary circuit shall terminate over any combined feed and expansion cistern connected to a primary circuit.

No supply pipe or secondary circuit shall be permanently connected to a closed for filling a heating system unless it incorporates an approved backflow prevention device.

HOT WATER STORAGE VESSELS – CHECKLIST 1

- Storage temperature 60oc
- Avoid stratification
- Consider shunt pumps
- Change vessel design on replacement
- Couple vessels in parallel
- Check volume, usage and recovery rates
- Drained regularly to prevent sludge accumulation
- Dismantled at least yearly (water/water)

HOT WATER STORAGE VESSELS – CHECKLIST 2

- Occasional pasteurisation (thermal disinfection)
- Check for temperature variations regularly
- Insulate bottom of vessel
- Drain facility (25mm min)
- Access for cleaning
- At least annual inspections
- Twice yearly in hard water areas

HOT WATER STORAGE VESSELS – CHECKLIST 2

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- Check for temperature variations regularly
- Check for temperature variations regularly
- Insulate bottom of vessel
- Drain facility (25mm min)
- Access for cleaning
- At least annual inspections
- Twice yearly in hard water areas

4. Hygiene Practices

These guidance notes are intended to highlight good hygiene practices for personnel involved with all aspects of work on hot and cold water systems.

Definitions used

- ‘Restricted Area Operations’ means work involving direct or potential contact with mains or stored water used for domestic purposes
- ‘Domestic Purposes’ means water used for drinking, washing, cooking and sanitary purposes within all types of premises
- ‘Restricted Area Personnel’ means persons who have been approved for working on water services used for domestic purposes.

Medical Assessments of Personnel

Restricted area personnel must be selected with care. The medical history of each person should be investigated with particular reference to any infection

capable of being water-borne. People who have been overseas are, especially liable to have contracted water-borne infections.

Toilets and Washing

Water undertakings should make arrangements for toilet and washing facilities to enable all personnel to maintain the highest standards of personal cleanliness. Toilet wastes must be disposed of safely.

Clothing

Protective clothing, such as boiler suits, waterproofs, rubber boots, safety boots and gloves to be used in restricted areas should be clean. It should be stored apart from other protective clothing, kept free from contamination and its purpose clearly identified. Colour coding or alternative marking of clothing for restricted operations is recommended.

Plant, Tools, Instrumentation and Other Equipment

Care should be taken to ensure that plant; tools, instrumentation and other equipment used in restricted operations are free from contamination before use. Items such as pumps and hoses used in contact with treated water must be stored separately, clearly identified by colour coding, and must not be used for any other purpose. Tools and equipment for restricted operations should be kept clean and appropriately disinfected. Colour coding may be advantageous

DISINFECTION INSTRUCTIONS

Fluids

- Remove dip slide from its sterile bottle, holding it by the cap to avoid touching the culture medium.
- Immerse dip slide tongue into the fluid to be tested, or expose to a spray or running fluid
- Remove dip slide from fluid and allow to drain (do not shake) for a few seconds
- Incubate dip slide for 2-3 days at a temperature approximately equal to that of the test fluid.

E.g. 25°C – 30°C for process/cooling water
30°C for machine tool coolants
30°C for rolling mill coolants

Incubate for longer if the incubation temperature is considerably cooler than the test liquid.

Surfaces

- Remove dip slide tongue from its sterile bottle, holding it by the cap to avoid touching the culture medium

- Lightly press each side of the dip slide tongue flat against adjacent areas of the test surface, then replace in the bottle and seal
- Cleanse residual medium from the tested surface with a disinfectant wipe.
- Incubate dip slide for 2-3 days at a temperature approximately equal to that of the test surface

E.g. 20°C – 30°C for heat exchanger surfaces in cooling towers

Storage

Store dip slides in a cool place before use, but do not refrigerate. They will remain suitable for use as long as there is no visible contamination, and the agar surface remains smooth and attached to the tongue

Disposal

Dispose of used dip slides by burning or by immersing slides and containers in fresh disinfectants overnight.

Bacteria

Almost all aerobic bacteria and most yeasts will grow on the paler (TTC) side of the dip slide. Compare the numbers or density of colonies (red or colourless dots) with the chart to estimate the numbers of organisms present in the original fluid.

If the bacteria count of the fluid is high, a confluent growth can appear on the surface of the slide rather than distinct colonies. If this confluent growth is colourless, it could be misinterpreted as 'no growth'. It is recommended that the slide is examined against a reflected light or compared with a sterile, unused dip slide.

Fungi

Fungal contamination (includes yeasts and moulds) can be determined from the darker (Malt Agar) side of the dip slide. Yeasts usually appear as smooth, round colonies often coloured white, beige or sometimes red. The number of yeasts in the fluid tested may be estimated as for bacteria, using the comparison chart. Other fungi (e.g. moulds) appear as characteristic 'fur' colonies, quickly spreading across the surface of the slide.

5. Monitoring Guidance

Action levels following Legionella sampling in Hot and Cold Water Systems.

Legionella Bacteria CFU/Litre	Action Required
More than 100 But less than 1000	Either <ol style="list-style-type: none"> Low number of positives system to be re-sampled. If similar count again, review control measures and risk assessment should be carried out to identify and remedial actions. If majority of samples are positive, system

	may be colonised. Disinfection should be considered but a review of control measures and risk assessment should be carried out
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6. Monitoring For Legionella/Cooling Towers

In addition to routine sampling for aerobic bacteria, the routine monitoring scheme should also include periodic sampling for the presence of Legionella Bacteria.

This should be undertaken at least quarterly unless:

- Identifying possible sources of the bacteria during outbreaks of Legionnaires Disease
- More frequent when commissioning s system and establishing a treatment programme. (Monthly)
- If Legionella positive is found more frequent samples may be required as part of the review of the system risk assessment

The sampling method should be in accordance with ISO 11731: 1998 and tested by a UKAS Accredited Laboratory