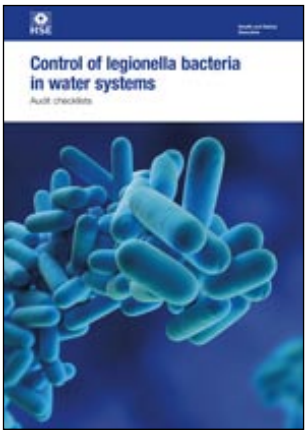
Control of legionella bacteria in water systems

Audit checklists



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These checklists are for the health and safety responsible person to use, to audit arrangements in premises, to control legionella in water systems. They audit the risk assessment process and take the responsible person through the recommended measures in the Approved Code of Practice and guidance. There are three checklists:

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This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

Introduction

These checklists are designed to help you, as the **responsible person**, audit the arrangements in place to control legionella in the water systems in your premises. This is a check on your knowledge of the system. It also checks the knowledge of those who play a role in controlling the risks from the system, for example water treatment contractors. There would be no value in asking a third party to complete this audit. As the responsible person, you should have been appointed because you have 'sufficient authority, competence and knowledge' of the systems in your workplace.[1]

The checklists are not risk assessments. They have been prepared on the basis that you have already identified a risk system(s) in your workplace and that you need to put in place (or review) measures to prevent or control the risks from exposure to legionella bacteria. However, the first checklist addresses a number of issues relating to the risk assessment, so you can audit the assessment process itself.

The system checklists (Checklist 2 covers cooling towers; Checklist 3 covers hot and cold water services) take you through the recommended measures in the Approved Code of Practice (ACOP) and guidance[1] on controlling legionella bacteria in water systems. These allow you to audit the arrangements you have in place or intend to put in place. A negative answer to any of the questions indicates that you need to review the arrangements you have in place.

The checklists do not give guidance on how to achieve control, you should consult the ACOP and guidance[1] for detail on control measures and how they are put in place and monitored.

Using the system checklists requires you to carry out both a physical inspection of the system as well as examining the management procedures and paperwork in place. You also need to talk to those who may have responsibilities for any aspects of the control regime.

The checklists only cover the two main risk systems. You will also need to assess whether there are other sources of risk in your workplace and put in place appropriate control measures.

Name of auditor	
Date of audit	
Date of review (see Checklist 1: Note 2)	

Action required (list)	**Completed**

Checklist 1

The risk assessment

		YES	NO
1	Did you consider whether you could eliminate the risk?		

Note 1: Your primary duty under the Control of Substances Hazardous to Health Regulations is to prevent the risks from exposure. You may be able to do this by looking at the type of water system you need, for example you may not need a wet cooling system.

2	Did the person carrying out the assessment have access to competent help and advice when carrying out the assessment?		
3	If there are more than five employees in your organisation, did you record the significant findings of the assessment?		
4	Did you consult employees about the assessment and the control measures?		
5	Have you identified the circumstances which would require a review of the assessment?		

Note 2: Your assessment should be reviewed regularly – at least every two years, and whenever it is suspected it is no longer valid, for example if there is a significant change to the system.

Managing the risks: Roles and responsibilities

6	Has a 'responsible person' been identified in writing?		

Note 3: If risks have been identified, there needs to be someone to take charge of managing the control regime.

7	Is there a nominated deputy?		
8	Are contact details for these people readily available (in the event of an emergency)?		
9	Are the roles and responsibilities of all the staff involved in the control regime clearly defined in writing?		
10	Have they all received appropriate training?		

		YES	NO
11	If external contractors are used, are their roles and responsibilities clearly defined in writing?		
	Note 4: The demarcation between contractor and occupier needs to be defined, ie who does what. But remember that using contractors does not absolve you of the responsibility for ensuring that the control regime is carried out.		
12	Have you checked the competence of contractors?		
	Note 5: For example, you should ask about experience and qualifications, how their staff are trained, and whether they are a member of a professional organisation/recognised trade body, for example the Code of Conduct Association. You can find out about the health and safety performance of companies by checking HSE's enforcement databases (www.hse.gov.uk/notices and www.hse.gov.uk/prosecutions).		
13	Have you considered all other health and safety issues (eg COSHH assessments for handling of water treatment chemicals, working at height, working in confined spaces, electrical safety and ease of access to parts of the system)?		

Checklist 2

Cooling towers

		YES	NO
	Record details of tower below (ie make, model, year of manufacture, type) - you should complete a checklist for each tower.		
1	Has the cooling tower(s) been notified to your local authority?	☐	☐

Note 1: Under the Notification of Cooling Towers and Evaporative Condensers Regulations, you must notify the local authority in writing with details of where it is based. If it is taken out of use, you also need to tell them.

Managing the risks: The written scheme

2	Is there a written scheme for controlling the risk from exposure to legionella bacteria?	☐	☐
3	Does the scheme contain an up-to-date plan of the system (a schematic plan is OK)?	☐	☐
4	Does the plan show:		
•	■ all cooling towers?	☐	☐
•	■ all system control valves?	☐	☐
•	■ all standby equipment, eg spare pumps?	☐	☐
•	■ the location of system bleed valves?	☐	☐
•	■ all associated storage tanks?	☐	☐
•	■ all associated pipework?	☐	☐
•	■ the location of chemical dosing points and/or injection points?	☐	☐
•	■ the location of the system drain valve?	☐	☐

Note 2: If your assessment has shown that there is a reasonably foreseeable risk of exposure to legionella bacteria, there needs to be a written scheme in place to control that risk.

		YES	NO
•	■ the origin of the water supply?		
•	■ any parts that may be temporarily out of use?		
5	Does the **scheme** contain instructions for operating the system (see Q17-21)?		
6	Does the scheme contain details of the precautions to be taken to control the risk of exposure to legionella bacteria (see Q22-26)?		
7	Does the scheme contain details of the checks that are to be carried out (and their frequency) to ensure that the scheme is effective (see Q27-38)?		

Cooling systems: Design and construction

8	If you are installing a new tower, have you considered its position in relation to:		
•	■ air conditioning and ventilation inlets?		
•	■ opening windows?		
•	■ occupied areas (for example consider the population density and the proximity of those who may be more vulnerable to infection, for example in hospitals)?		

Note 3: Remember that you have duty to protect those who may be affected by the risks created by your towers.

9	Is the tower constructed from impervious materials?		

Note 4: Preserved timber can be used but it must be impervious and easy to clean and disinfect.

10	Are drift eliminators fitted?		
11	Are they:		
•	■ fitted correctly?		
•	■ effective?		

Note 5: Drift eliminators do not eliminate drift but they do reduce it. You should use those which control the release of small water droplets. For example, wooden slats don't do this and must be replaced.

		YES	NO
12	Is the area above the pond as enclosed as possible?		
13	Are all visible surfaces free from:		
•	■ slime or algae?		
•	■ scale?		
•	■ corrosion?		
14	Does the water flow evenly across the fill pack?		
15	Have all the following been removed as far as possible:		
•	■ dead legs/blind ends?		
•	■ redundant pipework?		
•	■ redundant plant?		
16	Are those parts of the tower that become wet, accessible and/or removable for cleaning?		

Operation and maintenance

17	Is the system in regular operation (if no, see Q20-21)?		
18	Are there procedures in place to operate standby equipment on a rotational basis?		
19	Is there an operations manual for the cooling system?		
	Non-regular use		
20	If the tower is used intermittently or is required at short notice, is it run at least once a week, so that water treatment chemicals are circulated to all parts of the system?		
21	If the tower is out of use for longer than a week, are there procedures in place to bring the tower back into operation safely?		

		YES	NO
	Water treatment programme		
22	Is there a water treatment programme in place?	☐	☐
23	Are chemicals/biocides used to control:		
•	■ scale?	☐	☐
•	■ corrosion?	☐	☐
•	■ fouling?	☐	☐
•	■ microbiological activity?	☐	☐
	If no to any of the above, list methods used below.		
	☐		
24	If non-oxidising biocides are used, are two used alternately?	☐	☐
25	Are chemicals dosed automatically?	☐	☐
26	If yes to Q25, are the pumps calibrated regularly?	☐	☐

Note 5: Although there is no requirement for automatic dosing, you should consider issues associated with manual dosing - the health and safety risks, for example manual handling and exposure to chemicals, to staff who carry out manual dosing, as well as the management of the process to make sure the frequency and rate of application are maintained.

		YES	NO

Monitoring

27	Is there a daily check to make sure that the system is operating as described in the operations manual?		
28	Is there a daily visual check of the cleanliness of the water in the system?		
29	Is the physical condition of the system checked at least every week?		
30	Is the chemical composition of the cooling and make-up water monitored on a regular basis?		

Note 6: A number of different parameters are given in Table 1 of the ACOP and guidance.[1] You should be clear what parameters you need to measure and what they are telling you about the operation of your tower. Usual parameters that are monitored include hardness (calcium, magnesium and total hardness), conductivity and the concentration factor.

31	Are the safe operating limits for each parameter which is being measured, known and recorded in the operating manual?		
32	Is the corrective action for out of limit situations known and included in the operations manual?		
33	Are results of all tests and checks recorded, together with details of any remedial action taken (if required)?		
34	Are dip slides taken on at least a weekly basis?		
35	Are slides incubated in an incubator (at 30°C for 48 hours)?		
36	Are results recorded, so trends over time can be seen?		
37	Are samples for legionella taken on at least a quarterly basis?		
38	Have the circumstances when more frequent sampling may be required been identified and recorded?		

		YES	NO
	Cleaning and disinfection		
39	Is there a written procedure for regular cleaning and disinfection of the system?		
40	Does this take place at least every six months (if not, see Q43)?		
41	Does the cleaning and disinfection procedure include:		
•	■ initial concentration of oxidising biocide in use for the pre- and post-cleaning disinfection stages?		
•	■ contact time for each disinfection stage?		
•	■ methods for carrying out cleaning, including the removal of packing?		
42	If packs cannot be removed, are there alternative methods of making sure they remain clean in place (list methods below)?		
43	If the system is not shut down every six months, list reasons and alternative measures taken to ensure the cleanliness of the system below.		
44	Are measures taken to protect staff when carrying out cleaning of the tower - list precautions below?		

Checklist 3

Hot and cold water services

	YES	NO
Type of system(s) (tick)		
☐ Gravity without recirculation		
☐ Gravity with recirculation		
☐ Pressurised		
☐ Other (describe below)		

Managing the risks: The written scheme

		YES	NO
1	Is there a written scheme for controlling the risk from exposure to legionella bacteria? *Note 1: If your assessment has shown that there is a reasonably foreseeable risk of exposure to legionella bacteria, there needs to be a written scheme in place to control that risk.*		
2	Does the scheme contain an up-to-date plan of the system (a schematic is OK)?		
3	Does the plan show and identify:		
	■ all system plant, for example water softeners, filters, strainers, pumps, non-return valves and all outlets, for example showers, wash-hand basins etc?		
	■ all standby equipment, for example spare pumps?		
	■ all associated pipework and piping routes?		
	■ all associated storage and header tanks?		
	■ the origin of water supply (see Q18)?		
	■ any parts that may be out of use temporarily?		
4	Does the scheme contain instructions for the operation of the system (see Q18-23)?		

		YES	NO
5	Does the scheme contain details of the precautions to be taken to control the risk of exposure to legionella bacteria (see Q24-26)?		
6	Does the scheme contain details of the checks that are to be carried out (and their frequency) to ensure that the scheme is effective (see Q27-40)?		

Design and construction

7	If you are fitting a new system, do any of the materials or fittings used in the water systems support the growth of micro-organisms? *Note 2: The Water Research Centre publish a directory which lists materials and fittings acceptable for use in water systems.*		
8	Are low corrosion materials used?		
9	If fitted, are thermostatic mixing valves (TMVs) sited as close as possible to the point of use? *Note 3: Ideally, TMVs should not be fitted to multiple outlets but, if they are used, the mixed water pipework should be kept as short as possible.*		

Cold water system

10	Are low use outlets installed upstream of higher use outlets?		
11	Has cold water storage been assessed and minimised, ie holds enough for a day's use only?		
12	Is piping insulated and kept away from heat sources (where possible)?		
13	Is the cold water tank:		
•	■ fitted with a cover and insect screen(s) on any pipework open to the atmosphere?		
•	■ located in a cool place and protected from extremes of temperature?		
•	■ accessible?		

		YES	NO
	Hot water system		
14	Does the calorifier storage capacity meet normal daily fluctuations in hot water use while maintaining a supply temperature of at least 50°C (see Note 5)?		
15	Are the hot water distribution pipes insulated?		
16	If more than one calorifier is used, are they connected in parallel?		
17	Does the calorifier have the following fitted:		
•	■ a drain valve?		
•	■ a temperature gauge on the inlet and outlet?		
•	■ an access panel?		

Operation and maintenance

18	If the water supplied to your building is not mains supply, has the water been pre-treated to make sure it is of the same quality as the mains?		
19	Is the entire contents of the calorifier, including the base, heated to 60°C for an hour each day, for example by using a shunt pump?		
20	Are all outlets that are no longer required cut back as far as the main pipe run?		
21	Are there arrangements to incorporate standby equipment, for example calorifiers, pumps, into routine use?		
22	If little used outlets have not been removed, are there arrangements in place to either:		
•	■ flush them through on at least a weekly basis (with records kept of this)? or		
•	■ carry out a safe purge of stagnant water before use?		

Note 4: It is important that this purge is carried out with the minimum production of aerosols, for example by piping directly to the drain.

		YES	NO
23	If thermostatic mixing valves are fitted, are they included in the maintenance schedule?		

Water treatment programme

24	Is there a water treatment programme in place?		
25	Is temperature used as a control method (go to Q27)?		
26	Are biocides used as a control method? Give the method below (go to Q33).		

Monitoring

Temperature

27	If there is a risk of scalding (for example where the young, elderly or disabled may use the outlets), are thermostatic mixing valves fitted?		
28	Is the temperature of sentinel hot and cold water outlets checked on a monthly basis?		

Note 5: For cold water, the temperature should be 20°C or below and for hot water, at least 50°C.

29	If fitted, is the temperature of the water supply to thermostatic mixing valves checked on a monthly basis?		
30	Is the temperature of the water in the outlet and return pipes of the calorifier checked on a monthly basis?		
31	Is the temperature of the incoming cold water supply checked on a six-monthly basis?		
32	Is the temperature of a representative number of hot and cold water outlets checked on an annual basis?		

		YES	NO
	Biocides		
33	Is the control level required known and recorded in the operations manual?		
34	Is the rate of release/rate of addition of biocide known and recorded?		
35	Is the concentration of the biocide at sentinel outlets checked on a monthly basis?		
36	Is the concentration of biocide checked at representative outlets on an annual basis?		
	General		
37	On an annual basis is there:		
•	■ a visual check of the cold water tank and the water in it?		
•	■ a check to see if there is reasonable flow through the cold water tank, ie good tangential flow across the tank?		
•	■ a drain of the calorifier and a check for debris?		
•	■ a check on the plans for the hot and cold water circuits to make sure they are up to date?		
•	■ a check on the existence of all water connections to outside services?		
38	Are results of all tests and checks recorded, together with details of any remedial action taken (if required)?		
	Microbiological		
39	Are there procedures in place to identify circumstances when either general microbiological monitoring or sampling for legionella would be appropriate?		
40	If there are procedures in place, do these identify where samples should be taken, and the frequency and actions required?		

		YES	NO
	Cleaning and disinfection		
41	Have the circumstances when cleaning and disinfection of the hot water system would be appropriate been identified?		
42	If cleaning and disinfection were to be carried out, which of the following methods would be used?		
	■ thermal?		
	■ chemical?		
43	Are procedures in place for the chosen method of cleaning and disinfection?		

References

1 *Legionnaires' disease. The control of legionella bacteria in water systems. Approved Code of Practice and guidance* L8 (Second edition) HSE Books 2000 ISBN 978 0 7176 1772 2.

Further information

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