

BS 8580-1:2019



BSI Standards Publication

**Water quality – Risk assessments for
Legionella control – Code of practice**

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Contents

	Page
Foreword	ii
Introduction	1
1 Scope	2
2 Normative references	3
3 Terms and definitions	3
4 Factors to be considered in the risk assessment	6
5 Preparations for risk assessment	6
5.1 Competence of the risk assessor	6
5.2 Agreeing the terms of reference	7
5.3 Independence	8
6 Desktop appraisal of documentation	9
6.1 Preparation	9
6.2 Appraisal of the current scheme of control	10
7 Site survey	12
7.1 General	12
7.2 Visual inspection of utilities/location for possible sources of contamination	13
7.3 Measurements	14
7.4 Testing for <i>Legionella</i>	14
8 Evaluation of the risk	14
8.1 General	14
8.2 Risk rating systems	15
9 Risk assessment reporting	15
9.1 General	15
9.2 Identified risks	16
9.3 Control measures	17
10 Risk review and reassessment	17
Annex A (informative) Factors to be considered during a risk assessment	20
Annex B (informative) Hot and cold water systems	24
Annex C (informative) Open evaporative cooling systems	27
Annex D (informative) Spa pools	28
Figure D.1 — Diagram of a typical hot tub	30
Figure D.2 — Diagram of a typical commercial spa pool	31
Annex E (informative) Other systems	31
Figure E.1 — Example of a car wash schematic diagram	36
Annex F (informative) List of equipment	41
Annex G (informative) Schematic diagrams	42
Figure G.1 — Example of a computer-drawn schematic diagram of an evaporative cooling system	44
Figure G.2 — Example of a hand-drawn elevation of a hot and cold water system in a commercial building	45
Bibliography	46

Summary of pages

This document comprises a front cover, and inside front cover, pages i to ii, pages 1 to 48, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 January 2019. It was prepared by Subcommittee EH/3/4, *Microbiological methods*, under the authority of Technical Committee EH/3, *Water quality*. A list of organizations represented on these committees can be obtained on request to their secretary.

Supersession

This British Standard supersedes [BS 8580:2010](#), which is withdrawn.

Use of this document

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

The word “should” is used to express recommendations of this standard. The word “may” is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word “can” is used to express possibility, e.g. a consequence of an action or an event.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Introduction

Legionellosis refers to illness caused by bacteria of the genus *Legionella* including Legionnaires' disease and Pontiac fever. The most serious form of disease caused by *Legionella* is Legionnaires' disease, a severe pneumonia with a relatively high fatality rate, which was first recognized in 1976. Outbreaks and sporadic infections occur throughout the world. At least 61 species of *Legionella* have been described and over 28 have been associated with disease in humans, but the predominant cause of Legionnaires' disease is *L. pneumophila*. *Legionella* are opportunistic pathogens of humans and normally inhabit warm, moist or aquatic environments where they grow in association with other organisms. In particular, they are known to grow in a range of protozoa. Their predilection for warm water means that they are capable of colonizing artificial water systems and equipment containing water. Legionnaires' disease is not contagious from person to person but is of environmental origin and usually contracted by inhaling the organism in an aerosol produced from water contaminated with the organism. Aspiration of water (water going down the wrong way) containing *Legionella* can also cause infection, particularly in hospitalized individuals.

There is a chain of events leading to an individual contracting Legionnaires' disease:

- the water system needs to become contaminated (inoculated) with the bacteria;
- hazardous conditions have to exist within the system for the amplification of the bacteria to sufficient concentrations to cause infection;
- the contaminated water usually needs to be dispersed into droplets fine enough to form an aerosol for transmission to the individual;
- inhalation of contaminated aerosols or, in rare cases, aspiration of contaminated drinking water; and
- the exposed individual has to be susceptible to succumb to infection.

The ubiquitous occurrence of *Legionella*, combined with their association with protozoa, means that all building water systems are susceptible to contamination with *Legionella* via the water supply or dust entering the system. It is therefore normal practice to assume that a system can become contaminated. Whether the amplification of *Legionella* is likely within the equipment or system can be inferred from the conditions of the water; the design, construction and operating conditions of the equipment or system at the time of assessment; and records of treatment and monitoring of the equipment or system in the past. It is not recommended to test for the presence of *Legionella* prior to the implementation of a water management programme.

The generation of aerosols can be observed in the operation of systems such as cooling towers, evaporative condensers, industrial processes, spa pools/hot tubs, showers and taps. Many of these can produce substantial aerosols. Some systems, such as cooling towers, evaporative condensers and some industrial processes, can transmit the aerosol widely, exposing a large population over an area up to several kilometres. Spa pools and hot tubs can expose many users and anyone in the immediate vicinity, while showers and taps are most likely to lead only to the exposure of individual users.

Finally, for an individual to become infected following exposure they have to be susceptible, usually having predisposing conditions. Only a very small proportion of those exposed develop disease, but increasing age, particularly 50 years and over, smoking, being male and being immunosuppressed through disease or treatment can increase susceptibility. Host susceptibility is therefore an important factor influencing risk and needs to be considered in the assessment.

A site-specific analysis of hazardous conditions allows appropriate control measures to be identified and put in place to protect the health and safety of employees and members of the public who could be affected by work activities. *Legionella* risk assessment is no different and is a legal requirement

under the Health and Safety at Work etc. Act 1974 [1]. The Management of Health and Safety at Work Regulations [2], [3] and the Control of Substances Hazardous to Health Regulations [4], [5] make specific requirements for risk assessment. These regulations apply to the control of *Legionella* and are embodied in the Approved Code of Practice and guidance document, “*Legionnaires’ disease: The control of Legionella bacteria in water systems*” [6], otherwise known as ACoP L8, and the associated Technical Guidance HSG274 Parts 1 to 3 [7] and HSG282, *The control of legionella and other infectious agents in spa-pool systems* [8].

Risk assessment is an ongoing process and the report of the risk assessment’s findings is a live document. The risk assessment report needs to be reviewed regularly in anticipation of, rather than in response to, changes. For example, the risk assessment for a new construction ought to be performed before commissioning, but then reviewed when the system has been operating normally for several weeks or months. It is recommended that a risk assessor is involved from the design stage onwards.

It is the responsibility of the duty holder to ensure that an assessment is carried out to identify and assess the risk of exposure to *Legionella* from work activities and water systems and to put in place any necessary precautions. The duty holder appoints a person to take day-to-day responsibility for controlling any identified risk from *Legionella*. The appointed competent person(s) (also known as responsible person) needs to have:

- a) sufficient standing and authority within the organization (e.g. a manager or director) and competence and knowledge of the system to ensure that all operational procedures are carried out in a timely and effective manner; and
- b) a clear understanding of their duties and the overall health and safety management structure and policy in the organization.

If the duty holder is competent, they may appoint themselves as the competent person. Further guidance for duty holders on how to put in place suitable arrangements for managing health and safety risk is provided in HSG65: *Managing for Health and Safety* [9].

A person is identified to carry out the risk assessment. This person can be an employee of the duty holder or an external contractor. This British Standard gives recommendations for how such a person conducts a risk assessment for *Legionella*, though the duty holder remains accountable for implementing the recommendations.

1 Scope

This British Standard gives recommendations and guidance on *Legionella* risk assessment relevant to water systems. It is applicable to any undertaking involving a work activity or premises controlled in connection with a trade, business or other undertaking where there is potential for exposure to water or when water is used or stored in circumstances that could cause a reasonably foreseeable risk of infection by *Legionella* and contracting legionellosis.

This British Standard is applicable to risk assessments being undertaken on premises, plant and systems for the first time. It also covers reviews and reassessments where a previous assessment has been undertaken and where control measures might have been implemented.

While the principles of risk assessment presented in this British Standard can be applied to natural waters, including rivers, lakes, ponds, waterfalls, caves, dew ponds or natural recreational facilities, such as boating lakes, this British Standard does not give specific recommendations for these water sources. This British Standard does not give recommendations for the preparation of the scheme of control for the risk systems identified.

[Annex A](#) gives general guidance on the assessment of systems, while [Annex B](#) to [Annex E](#) give guidance on the assessment of specific types of system. A list of equipment that might be used by a risk assessor is given in [Annex E](#), and [Annex G](#) gives guidance on the production of schematic diagrams.

NOTE The guidance in the annexes is not intended to be exhaustive but merely to highlight some of the more common issues associated with particular systems to be considered as part of a Legionella risk assessment. Where appropriate, these annexes contain references to publications that give more detailed information about these systems.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[BS 7592](#), *Sampling for Legionella bacteria in water systems — Code of practice*

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 aerosol

suspension in a gaseous medium of solid particles, liquid particles or solid and liquid particles having negligible falling velocity

NOTE In the context of this document, it is a suspension of particles which might contain Legionella with a typical droplet diameter size of <5 µm that can be inhaled deep into the lungs.

3.2 aspiration

liquid accidentally passing into the lungs when swallowing

NOTE This is commonly referred to as water “going down the wrong way”.

3.3 asset register

list of all items relevant to the risk and control of legionellosis and pertinent information to allow them to be effectively used in the written scheme of control and in the risk assessment

NOTE Ideally, this will be made available to the risk assessor by the duty holder. This includes the physical components of the system and might also include other standalone items that could present a legionellosis risk. It also includes the schematic diagram, scheme of control and risk assessment.

3.4 biofilm

community of bacteria and other microorganisms and entrained debris, embedded in a protective layer at interfaces in water systems

3.5 calorifier

apparatus used for the transfer of heat to water in a vessel by indirect means and incorporating a source of heat

3.6 dead end**blind end****capped pipe**

length of pipe closed at one end through which no water passes

[SOURCE: HSG274, Part 2, 2014 [7]]

3.7 dead leg

length of water system pipework leading to a fitting through which water only passes infrequently when there is draw off from the fitting, providing the potential for stagnation

[SOURCE: HSG274, Part 2, 2014 [7]]

3.8 doubling time

time taken for a population of an organism to double in number

3.9 guidance for control

findings from the risk assessment that can be used in producing a scheme of control

3.10 hazard

biological, chemical or physical agents or water conditions with potential to cause adverse health or safety-related effects

3.11 key roles**3.11.1 duty holder**

individual(s) with the legal responsibility to ensure that health and safety is managed effectively

NOTE 1 The duty holder is the employer where the risk is from their undertaking to their staff or others, the self-employed person where the risk is from their undertaking to themselves or others, or the person in control of the premises where the risk is from systems in the building (e.g. a landlord who remains responsible for the maintenance of the systems). See ACoP L8, para. 28.

NOTE 2 In most cases there will only be one duty holder, but in cases of shared accommodation there could be a shared duty. There might be some cases where the duty holder is a group such as a corporate body, Trust, etc. The duty holder cannot delegate this duty, but can delegate managerial responsibility to the competent person, also known as the nominated responsible person (see 3.11.2).

3.11.2 competent person

individual appointed with, and who has accepted, responsibility under the authority of the duty holder for ensuring that the organization's responsibilities for the control of *Legionella* are met and that all individuals and organizations assigned to carry out tasks in the scheme of *Legionella* control are competent to do so

NOTE 1 Also referred to as the "nominated responsible person". This role can be taken by more than one individual, for example, in a water safety group.

NOTE 2 In a large undertaking there may be more than one competent person, each responsible for a part of the undertaking, e.g. each block of a large teaching hospital.

3.12 Legionella

genus of bacteria first described as a result of the outbreak of Legionnaires' disease in Philadelphia at the Bellevue-Stratford Hotel in 1976

NOTE It contains at least 61 species, according to www.bacterio.net. [Last viewed 12 December 2018.]

3.13 logbook

- a) system activity logbook
- b) operator activity logbook

record book (one or more) or its electronic equivalent where all relevant details of the system, the operation, its performance, its monitoring and its maintenance can be entered in a secure manner for subsequent retrieval

[SOURCE: BS EN ISO 16484-2:2004, **3.111** – order of bullets modified and monitoring added]

3.14 open evaporative cooling system

system in which a small proportion of a circulating body of water is caused to evaporate into the atmosphere, taking the latent heat of vaporization from the remainder of water and cooling it

3.15 risk

3.15.1 inherent risk

risk associated with the system before any action has been taken to control it

NOTE In the context of a Legionella risk assessment there is an assumption that the system is or will be inoculated at some point with Legionella.

3.15.2 risk (general)

likelihood of a hazardous event occurring and its consequences

NOTE In the context of this standard, amplification and dissemination of Legionella, and exposure to an aerosol of such, are hazards and legionellosis is the hazardous event.

3.15.3 residual risk

risk remaining after the application of control measures

[SOURCE: BS EN ISO 27000:2017, **2.64**, Notes removed]

3.16 risk assessments

3.16.1 risk assessment (general)

overall process of risk identification, risk analysis and risk evaluation

NOTE Includes hazard identification.

[SOURCE: BS 31100:2011, **2.24**, Note added]

3.16.2 Legionella risk assessment

process of identifying and assessing the risk of exposure to *Legionella* from work activities and from water systems or equipment

3.16.3 risk assessment review

process of determining if the current risk assessment and scheme of control are still valid and effective

NOTE This is completed by the competent person if systems are simple and/or they have an appropriate level of competence. Often the services of third party competent help is utilized for complex or high-risk systems such as evaporative cooling or hospital hot and cold water systems.

3.16.4 reassessment

process of reassessing a system after the need is determined by review

NOTE This entails all the steps needed in an initial risk assessment.

3.17 schematic diagram

simple but accurate illustration of the configuration of the water system, including parts that are out of use, to be effectively used in the written scheme of control and in the risk assessment

NOTE An example of a computer-drawn and a hand-drawn schematic diagram are given in [Annex G](#). These figures are monochrome, but colour might be useful for schematics of more complex systems.

3.18 scheme of control

procedures and checks intended to control the risk of *Legionella*, including an up-to-date schematic diagram

NOTE The scheme can be in either hard copy or electronic format.

3.19 water safety group (WSG)

multi-disciplinary group formed to undertake the commissioning and development and ongoing management of the risk assessment and the scheme of control

NOTE It also advises on the remedial action required when water systems for outlets are found to be contaminated.

3.20 WRAS

Water Regulations Advisory Scheme

4 Factors to be considered in the risk assessment

There is a chain of events leading to the infection of a human by *Legionella* which should be considered in any risk assessment process:

- a) contamination;
- b) amplification;
- c) transmission;
- d) exposure; and
- e) susceptibility of individuals exposed.

NOTE Further information on each of these is given in [Annex A](#).

5 Preparations for risk assessment

5.1 Competence of the risk assessor

NOTE 1 The person appointed to carry out the risk assessment may be the duty holder or an employee of the duty holder, but in many cases it is an external contractor.

The competence of the assessor is of paramount importance and should be matched to the complexity of the system and the risk being assessed. If the assessor is not competent then the assessment might not be suitable or sufficient. In each case, they should be able to demonstrate that they have sufficient experience, specialist knowledge and understanding of:

- the factors affecting the colonization by and growth of *Legionella*;

- the evaluation and assessment of risk from *Legionella* and the controls in place;
- the procedures necessary to complete surveys, measurements and sampling (see [Clause 7](#));
- the corrective actions that can be applied to reduce or eliminate the risk;
- the relevant control measures that can be applied, e.g. water treatment, inspections, monitoring, etc.; and
- the type of water system(s) and associated equipment to be assessed.

Risk assessors should provide evidence that they have undertaken the necessary training appropriate to the type and complexity of the system and the risk assessment required and gained practical experience with a competent assessor. Individuals commissioning risk assessments should establish the relevant competence of an assessor prior to appointment.

Assessors should have their competence formally assessed and there are organizations that require employees of service providers to do this, such as LCA's A Code of Conduct for Service Providers and UKAS accreditation for *Legionella* risk assessment. These records should be easily available for inspection.

NOTE 2 There are increasing opportunities for individuals to engage in independently recognized Continuing Professional Development (CPD) activities. This may be, for example, a record of certificates of attendance at relevant training courses, seminars and conferences, or participation in online training courses for related activities from recognized training providers.

Proportional management of *Legionella* risk is founded on effective risk assessment and any shortcoming in this process is likely to have an impact throughout risk management. Complex systems or those with unfamiliar equipment require assessors with the highest levels of competence. Assessors should obtain competent help, which might be from designers, manufacturers, specialist suppliers or technical operatives, in order to attain the collective competence to assess the risk in these systems.

NOTE 3 Hot and cold water systems can be simple in domestic and small commercial premises, more complex in larger commercial and residential premises and highly complex in healthcare and other speciality premises, each requiring a greater skill, experience, and/or training which contribute to the overall competence of the assessor. Non-domestic water systems including cooling tower systems, spa pools, hydrotherapy pools and some industrial systems depend on water treatment to control the legionellosis risk and therefore require an understanding of the principles of water treatment to complete the risk assessment. Other water systems can also range from simple to highly complex and might require the risk assessor to apply first principles rather than use a prepared format, in which case, assessors need greater knowledge and understanding of these principles and the judgement to apply them in unfamiliar situations.

*NOTE 4 There is an increasing requirement, particularly in healthcare premises, to undertake risk assessments for other waterborne pathogens such as *Pseudomonas aeruginosa* and non-tuberculous *Mycobacterium* species. As a consequence, there might be pressure to include these other organisms in a *Legionella* risk assessment or to carry out the risk assessments together. The risk factors and controls for other organisms are not necessarily the same as for *Legionella*. An individual who is competent to perform a *Legionella* risk assessment requires a different set of skills and competence to perform these other risk assessments. Competence may be demonstrated by, for example, a CV indicating the assessor's experience or a documented assessment of competence.*

5.2 Agreeing the terms of reference

The risk assessor should, before conducting the risk assessment, agree the following with the competent person and/or duty holder.

- a) The scope of the risk assessment, including identifying the systems that are to be assessed and those that are not to be assessed, taking into account the asset register, any schematic diagrams ([3.17](#)) and documentation on operation and maintenance. This is important as certain aspects

of the risk assessment could require specialist knowledge or equipment [including personal protective equipment (PPE)] to which the assessor would require access. The risk assessment should take into account all parts of the system, for example, a cooling tower should not be risk assessed in isolation from the rest of the cooling system, e.g. intermediate tanks, heat exchangers, pipework, pumps, etc.

- b) Whether and how the risk assessment addresses additional hazards, including biological, chemical or physical.

NOTE 1 This British Standard only applies to Legionella risk assessments.

- c) Whether the asset register and/or schematic diagrams have to be prepared or redrawn as part of the assessment and, if so, their form and their coverage.
- d) The person to whom the risk assessment is communicated and reported and to whom the recommendations are addressed.
- e) Time frames for key milestones and the completion of the risk assessment report.
- f) The necessary access to the site to be surveyed and the need for a competent escort, as necessary, who is familiar with the system(s) to be assessed and who will be responsible for the assessor's health and safety (see [Clause 7](#)).

NOTE 2 The assessor has a duty to not put themselves or others at risk during the visit.

- g) That the assessor will be made aware of any factors which could compromise the validity of the risk assessment process, such as planned treatment or maintenance.
- h) Any "permit to work" or access clearance necessary for access to the site of the assessment.
- i) The provision of unrestricted and safe access to all relevant parts of the system(s) to be assessed; how to record any unavoidable omissions; the effect any such omissions might have on the assessment; whether the required information can be obtained by other means and; what provisions should be made to provide access on a subsequent occasion. Wherever it is practicable to do so safely, all parts of the system(s) should be visited. Whenever reported information, such as records of previous inspections, is included, this should be recorded.
- j) Where a large number of essentially identical units/premises are to be assessed and it would be impractical or unrealistic to assess each individual unit/premises straight away, what proportion of these would constitute a representative sample (see [7.2](#)). For example, where there are a significant number of similar units under the control of the landlord, such as housing associations or councils, a representative proportion of the premises for which they have responsibility should initially be assessed on a priority basis, taking into account the susceptibility of occupants, similar design, size, age and water supply, with the entire estate eventually assessed on a rolling programme of work.

While there will inevitably be common factors associated with the many and varied types of premises being assessed such that a proportion of these may be treated as a representative sample (see [7.2](#)), the individual nature of each site should be taken into account.

5.3 Independence

The risk assessor should be able to demonstrate impartiality and independence when carrying out *Legionella* risk assessments. The risk assessor or assessing organization should not allow commercial, financial or other pressures to compromise impartiality and should be able to

demonstrate valid reasons for any proposed course of action. It should be clear, for example, why a recommendation has been made to clean cold water storage tanks.

NOTE 1 This could be achieved by including photographic evidence and, if required, supplementary testing to support the recommendation within the risk assessment report.

Where an organization provides risk assessment services as well as other services, for example, water treatment or cleaning and disinfection, it should have safeguards in place to ensure adequate segregation of responsibilities and accountabilities through appropriate reporting structures.

NOTE 2 It is important that a risk assessment is unbiased and the judgement of the risk assessor is not compromised by the assessor or a colleague responsible for designing, providing or implementing the risk control measures.

In circumstances where risk assessments are conducted internally, for example, by health and safety professionals working within the organization for which the assessment is undertaken, the assessment and any resulting recommendations should not be influenced by factors such as the cost of remediation.

6 Desktop appraisal of documentation

6.1 Preparation

If an existing risk assessment report is available, it should be appraised by the risk assessor to determine if it is still valid and to identify any changes since the last assessment.

NOTE 1 Appraising the current risk assessment can give the assessor valuable information about the water systems being assessed and the attitude of the management on site as demonstrated by their responsiveness to previous risk control recommendations made.

NOTE 2 The appraisal of the validity of the existing risk assessment cannot be performed adequately without a site survey (see [Clause 7](#)).

An appraisal should be carried out to determine whether the system is under control and the risk is continuing to be adequately managed. If the current controls, etc., are found to be insufficient or not to have been fully implemented where there have been adverse monitoring results, or if there has been a change in process or management, then the risk assessor should request/obtain and appraise the following:

- a) current risk assessment;
- b) current logbooks, asset register and schematic diagram(s) of the water system(s). This will allow the assessor to determine inherent risk arising from design and construction;

NOTE 3 In the absence of an up-to-date asset register or schematic diagram, the risk assessor has to make a value judgement as to whether they have sufficient information to complete and issue a risk assessment report.

- c) any recent *Legionella* control audits;
- d) the current written scheme of control, including:
 - 1) the maintenance history of the water system(s) to be assessed;
 - 2) training records of, and records of competence checks on, site personnel and contractors;
 - 3) monitoring and inspection records;
 - 4) the scheme for the safe operation of the systems;
 - 5) timely and appropriate reactions to lapses of control;
 - 6) any substantive changes in the at-risk population; and

- 7) any substantive changes to relevant personnel.

6.2 Appraisal of the current scheme of control

6.2.1 General

Where a scheme of control is in place, the risk assessor should undertake a detailed appraisal and audit of the scheme and report on its adequacy. If there is no scheme of control in place, a high priority in the risk assessment recommendations should be that one needs to be produced, unless the risk assessor considers that there is no reasonably foreseeable risk, in which case they should document that this is their assessment.

6.2.2 Appraisal of the maintenance and testing records within the scheme of control

The risk assessor should appraise any records showing implementation of the written scheme of control, ensuring that there is a dated signature or electronic identification against each record, depending on whether the records are stored in hard copy or electronically.

NOTE 1 Study of the maintenance records can help the assessor derive information about the continued success of any control measures that are already in place.

The risk assessor should note the relevance and success of the scheme which has been implemented. Evidence should be sought to confirm that work was completed competently and within a reasonable time, and the identity of those who carried out the work; certificates raised by others after the event should be supported by signed contemporaneous worksheets or their electronic equivalent.

The following should be considered for actions taken after adverse results have been found in the past.

- a) Were the correct actions taken and the correct communication chain invoked?
- b) Were the actions taken within a reasonable time?
- c) Were the results rechecked (after the action) to confirm conditions were back under control?
- d) If the actions did not result in better control, was an escalation procedure invoked to ensure conditions were eventually controlled? If not, is there an escalation procedure in place?
- e) Were there lessons learned or a new procedure put in place to prevent recurrence?

NOTE 2 The answers to all these questions, and the review in general, might also help the assessor gain some insight into the overall management of the site.

The scope of tests can vary according to the plant on each site, but a check should be made to ensure that all the control items or tests outlined within the recognized national guidance documents for each type of system are being considered.

If these records are not being kept, or cannot be found, the assessor should recommend that a system is put in place as a matter of priority in the final assessment report.

6.2.3 Appraisal of management responsibilities

The risk assessor should check that:

- a) the duty holder, the competent person and any deputies are clearly identified in the written scheme of control and that the appointment of the competent person(s) is confirmed in writing by the duty holder;
- b) where applicable, there is an appropriately comprised multi-disciplinary water safety group;
- c) the roles of all competent persons and parties (e.g. consultants, facilities management companies and water treatment companies) are clearly defined and contact details for these persons and parties are readily available;

- d) lines of communication and the reporting structure are clearly stated in the scheme of control; and
- e) the responsibility for tasks to be undertaken by each individual or party are outlined clearly with the necessary frequency of the tasks.

6.2.4 Appraisal of training records and competence checks of site and service provider personnel

The assessor should review the training records of those personnel with an involvement in the scheme of control and make comments as to their relevance and validity. In addition to the formal training records, the assessor should derive an indication of the level of competence of the staff by studying the site records.

NOTE 1 For example, the assessor can look at actions taken after adverse results have been found in the past to ensure that suitable corrective actions were taken in a timely manner. Records can also be checked to verify, as far as reasonably practicable, that staff are competent to take measurements (see 7.3).

Similarly, the assessor might be concerned that the checks on competence are inadequate, in which case they should make recommendations to improve the procedure for confirming competence.

If the assessor considers the training and/or competence of one or more of the parties to be inadequate, they should state this as part of the report and include the need for training or refresher training as a priority in the recommendations of the final assessment report.

NOTE 2 Common faults or shortfalls might include the following:

- a) no records or checks of competence in place;
- b) records are in place, but there is no indication of how competence was assessed;
- c) records in place, but refer to training rather than employees' ability to work safely and effectively;
- d) no checks on contractor, subcontractor or service provider competence;
- e) no review to confirm continued and up-to-date competence.

6.2.5 Appraisal of the safe operation of the systems

The risk assessor should check that there is a scheme for the safe operation and maintenance of all risk systems within the scope of the assessment which:

- a) includes a description of the correct operation of the plant and any precautions to be taken;
- b) details any start-up and shutdown procedures, and plant rotation and flushing requirements for little-used outlets;
- c) includes details of any plant or equipment brought onto site by third parties;
- d) includes, where appropriate, method statements, e.g. for major tasks such as cleaning operations;
- e) outlines any tests that are to be completed on the systems, along with the required frequency of the tests and the acceptable control parameters;
- f) details defects or out-of-parameter results; and
- g) logs appropriate corrective actions.

6.2.6 Appraisal of the monitoring and inspection records

The assessor should appraise the records of monitoring and inspections for the systems being assessed.

NOTE 1 These might be found within the written scheme of control or separate documents, such as logbooks (hardcopy or electronic) or maintenance reports. It is reasonable to expect these records to be easily available for inspection.

The assessor should identify the control parameters that have been set within the written scheme of control (chemical and/or physical) and check whether these have been set correctly before deciding if the existing control measures are adequate.

NOTE 2 The assessor will not necessarily have sufficient knowledge of specialized chemical formulations or control equipment or experience to determine whether any specified control parameters are appropriate. It might be necessary for the assessor to seek verification from the service provider or product manufacturer for products used and elements of the control programme.

The assessor should note the relevance and success of the monitoring and inspection work, including any microbiological tests, that has been carried out as these will indicate whether the correct actions have been taken based on the results obtained.

The results of inspections should be checked to see whether these indicate if the scheme of control is sufficient.

To obtain an indication of what to expect during the survey, the assessor should consider the following.

- a) Has the work been completed competently and in a timely manner?
- b) Has the work been completed at the correct frequency?
- c) Do the records indicate who carried out the work and when?

If these records are not being kept, or cannot be found, the assessor should recommend in the final assessment report that such a system be put in place as a matter of priority.

NOTE 3 Common faults found include:

- a) no records in place;
- b) records in place, but incomplete due to actions going unrecorded;
- c) actions not completed, for example, due to continued lack of access without escalation;
- d) inadequate or no escalation procedures;
- e) records are kept, but corrective actions have not been performed (or recorded as having being performed) following results which are out of specification;
- f) no preventative maintenance in place;
- g) no, or inadequate, records of maintenance in place;
- h) records not kept for appropriate periods, such as the five years required by COSHH [4], [5];
- i) work not completed in a timely manner.

7 Site survey

7.1 General

As part of the risk assessment, the assessor should conduct a site survey, with reference to the asset register, schematic diagrams and logbooks [see 6.1b)]. The assessor should use the survey to check that the schematic diagrams are still valid and up-to-date. They should also familiarize themselves

with the processes taking place on site, including how these could place limitations upon measures to control *Legionella* risks, for example, deliveries of food ingredients causing organic dust to be sucked into a cooling tower and reacting with the biocides.

If the assessor identifies an imminent danger of exposure to *Legionella*, e.g. failure of a biocide dosing system, cold or hot water supplies to aerosol-generating outlets, such as showers which are significantly too warm or too cool respectively, they should report this immediately to the competent person or their site representative, and not keep this for the final written report.

NOTE Attention is drawn to [Section 7](#) of the Health and Safety at Work etc. Act 1974 [1] regarding responsibilities of employees.

At the outset, the assessor should decide whether they have sufficient available information to assess the risk successfully. If they conclude that it is insufficient, for example because of the absence of schematic diagrams, or any other critical information, they should decline to issue the assessment, or decide to issue it in draft or otherwise qualified format, identifying any omissions and the effect they might have on the assessment.

Whether carrying out an assessment on a familiar site, or one previously unknown, the assessor should ensure their own personal safety from any health risks associated with the site. This includes operational hazards, for example, if plant is operating, history of positive *Legionella* testing results and associated hazards, such as those arising from working at height or in confined spaces [10], [11], [12], [13]. All hazards, their assessment and the precautions planned and taken, should be recorded.

The assessor should ensure that all necessary PPE is available, and prepare their own equipment list (see [Annex F](#)).

As part of the site survey the assessor should speak to management and staff to judge the effects of management culture and work practices of the organization in adding to (or reducing) the risk.

Where there is a current scheme of control, any sentinel/sampling points identified within it should be reviewed for their suitability.

7.2 Visual inspection of utilities/location for possible sources of contamination

The assessor should inspect the water system to confirm that the configuration is as illustrated in the schematic diagram (see [Annex G](#) for examples) and to determine the operation and condition of each system and its components to the extent that they could affect the proliferation and dissemination of *Legionella*. Details of each system should be examined, including any discrete plant or component and existence/location of sentinel points.

Where the system being assessed consists of several repeated units, such as multiple storeys or pods in a commercial building, the assessor should decide on representative examples to be inspected. A rolling programme should be employed to ensure that the same units are not assessed in successive cycles (see [5.2](#)).

NOTE 1 Where there are many individual self-contained units, such as flats or houses, the *Legionella* risk assessment may be scheduled to coincide with mandatory visits, such as those for gas safety checks. This type of approach may be appropriate in situations where access to housing units for *Legionella* risk assessment is problematic for whatever reason.

Where practicable, the assessor should check that the materials of construction of the water system have been tested for their tendency to support microbial growth as indicated, for example their compliance with BS 6920 (all parts).

NOTE 2 Attention is drawn to the Water Supply (Water Fittings) Regulations [14], [15].