



Awareness, induction and training

Provided by

LTM Assist
In house & Facilities Management

Training & Induction

HSE Quotes Legionella Risk Assessments Duties and what you should know

A brief example and summarised guide for consideration.

Further information may be found:

**HSE ACoP L8
HSG274 Part2 Hot and Cold Water Systems.**
Technical guidance to enable compliance with the Law

<http://www.hse.gov.uk/legionnaires/>

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To Follow

- Questions and Answers
- Multiple Choice Assessment
- Confirmation of Attendance

The Devil in the detail

HSE: 'All premises with a water system are now **within the scope of the revised ACoP.**'

'Anyone can develop Legionnaires' disease, but the elderly, smokers, alcoholics and those with cancer, diabetes or chronic respiratory or kidney disease are more at risk.'

Those who have an impaired immune system are especially categorised '**At Risk**'.

SUMMARY

'Legislative requirements for the control of Legionella put the responsibility clearly with the owner/operator of the water system.'

'If you are an employer or someone in control of premises, including landlords, you must understand the health risks associated with Legionella.'

Those responsible for maintenance and certification of the water system are jointly responsible and held as **Joint Duty Holder**.

The Law:

All properties under your control require a Legionella risk assessment to **properly identify and control** the risk of those present from contracting Legionella.

Principle Act of Parliament:

Health & Safety at Work Act 1974

Secondary Legislation:

The Control of Substances Hazardous to Health Regulations 2002

The Management of Health & Safety at Work Regulations 1999

Legionnaires' disease and the control of legionella bacteria in water systems – ACoP L8 (as revised 2013).

'Under general health and safety Law, duty holders including employers or those in control of premises, must ensure the health and safety of their employees or others who may be affected by their undertaking. They must take suitable precautions to prevent or control the risk of exposure to legionella. They also need to either understand, or appoint somebody competent who knows how to identify and assess sources of risk, manage those risks, prevent or control any risks, keep records and carry out any other legal duties they may have.'

Legal Duty:

'Hot and cold water systems are those that supply water for domestic purpose (drinking, cooking, food preparation, personal hygiene and washing).

Those who provide residential accommodation or who are responsible for water systems must assess the risk from exposure to Legionella to residents, tenants. Guests and customers and implement control measures.'

'You must carry out a risk assessment to identify and assess potential sources of exposure. You must then introduce a course of action to prevent or control any risk you have identified.'

'You will need to **refer to the ACoP for guidance** on the action you should take. As the design, maintenance and operation of the system are crucial in controlling the growth of legionella,'

System Types:

There are many types of water systems supplying hot and cold water services and these vary, also depending upon size and complexity of the building.

- Direct Mains Fed
- Gravity Fed
- Pressurised

Some will be served by various heating sources including:

- Combination boilers
- Instantaneous water heaters
- Low storage volume water heaters
- Combination water heaters.

Some systems will be found to have secondary hot water recirculation.

Hot water heaters- Calorifiers and Hot Water Cylinders will also vary.

- Indirect
- Direct fired
- Solar heated.

Other components such as Tanks, Expansion Vessels, Pumps, and Thermostatic Valves will also be found.

Systems and their components need to be identified and understood how they operate and influence the control of the bacteria, for proper consideration.

Basic Systems:

Some will be found in domestic properties and considered **Low-Risk systems**.

Example

'In a small building **without people especially 'At Risk'** From Legionella bacteria.

Where daily **water usage is inevitable and sufficient to turn over the entire system**.

Where cold water comes directly from the a wholesome mains supply (**no stored water tanks**)

Where hot water is fed from instantaneous heaters or low storage volume heaters (**supplying outlets at 50c**)

Where the only outlets are toilets and hand basins (**no showers**).'

'If the risk assessment concludes there is no reasonably foreseeable risk or the risks are insignificant and are managed properly to comply with the Law, the assessment is complete.'

The assessment should be reviewed periodically and when there are changes to the system or its use.

Showers and aerosol producing assets **increase risk** as can hidden assets and malfunctioning components.

Competency:

'As an employer or person in control of premises, you must appoint someone competent to help you meet your health and safety duties, i.e. take responsibility for managing the control scheme.'

'A competent person is someone with the necessary skills, knowledge and experience to manage the scheme effectively. You can appoint one or a combination of yourself, one or more workers, someone from outside your business.'

Duty Holder:

'It is the responsibility of the duty holder to ensure those appointed to carry out the tasks given to them have adequate information and support.'

A responsible person should be appointed to manage risks, landlords can appoint themselves.

Responsible Person:

'Carrying out a risk assessment is your responsibility. You may be competent to carry out assessments yourself, but if not, you should call on help or advise from within your organisation or from outside sources, e.g. consultancies.'

‘However, if there are some things they are not able to do, it is important to get external help.
Identifying and deciding what help is needed is very important.’

‘It is important they are satisfied that any contractors employed are competent to carry out the required tasks and that the tasks are carried out to the required standards.’

‘You or the responsible person responsible for managing risks, need to understand your water systems, the equipment associated with the system such as pumps, heat exchangers, showers etc., and its constituent parts. Identify whether they are likely to create a risk from exposure to Legionella, and whether.... it is likely that any of your employees, residents, visitors etc. are more susceptible to infection due to age, illness a weekend immune system etc. and whether they could be exposed to any contaminated water droplets.’

Training:

It is important that those responsible have a clear understanding of company and management policy and actions they should take.

Those responsible for smaller and less complex systems, some associated with domestic properties, can achieve a basic level of overall understanding to assist them through awareness and induction.

As systems become more complex and dependant on their use and occupancy, more detailed instruction is required.

A programme of staff training should be implemented.

‘To ensure that those appointed to devise strategies and carry out control measures are appropriately informed, instructed and trained, and should be assessed as to their competency.’

‘Inadequate management, lack of training and poor communication can be contributory factors.’

Confirmation of this is also integral to the assessment.

Communications:

‘Communication is a **key factor** in the risk assessment process. The risk needs to be identified and communicated to management to allow them to prioritise remedial actions to control it.’

Assessment:

‘The risk assessment should consider **all aspects of operation** of the hot and cold water systems and while there will be common factors, the individual characteristics of each system should be taken into account.’

Although water storage, use, cleansing and temperature control form the principle basis for consideration, other influencing factors need to be identified and considered that may affect the operation of the system and control of the bacteria.

Such as lagging and insulation, length of pipe runs, hidden assets, malfunctioning and non-compliant components, placement of anti-syphon valves, dead ends, materials that encourage microbiological growth, stratification, cycling of heat exchangers, pumps, aerosol producing assets, inserts and other components found.

Scald risk

‘Raising the temperature of your warm water is one way to control Legionella growth, but could also increase the risk of burns and scalding.’

‘The risk assessment should take account of susceptible ‘At risk’ people including young children, people who are disabled or elderly and to those with sensory loss for whom the risk is greater.’

Only once all influencing factors have been established can **proper consideration** be applied to determine the appropriate outcome.

Note

Just because there may be a flaw in the system does not necessarily mean water is not being delivered safely and an imminent risk posed.

It is important to understand the likely impact of such matters in relation to all aspects to determine the appropriate level of risk and where found higher, the appropriate action.

Water Analysis:

'Analysis of water samples for Legionella should be performed in UKAS accredited laboratories with the current ISO standard methods for the detection and enumeration of Legionella included with the scope of accreditation. These laboratories should also take part in water microbiology proficiency testing scheme (such as that run by PHE or equivalent scheme accredited to ISO 17043). Alternative quantitative testing methods may be used as long as they have been validated using ISO 17994 and meet the required sensitivity and specificity.'

Consideration for Analysis:

'If considered necessary by the risk assessment.

From areas where the target control parameters are not met (i.e. where disinfectant levels are low or where temperatures are below 50c for HWS or exceed 20c for cold water systems).

From areas subject to low usage, stagnation, excess storage capacity, dead legs, excessive heat loss, crossflow from the water system or other anomaly.'

Note

'All Premises with a water system are now **within the scope of the revised ACoP.**'

Although not widely associated with basic systems that may be found in domestic properties, if considered necessary and where there are persons categorised '**At Risk**' (especially those with an impaired immune system) '**Sampling for Legionella should be carried out.**'

Control Measures:

It is extremely important for Control measures to be put in place and maintained in **all** systems.

'The cleanliness of the system must be maintained, as Legionella bacteria are more likely to grow in a system fouled with deposits.'

Elaborate control measures or the need for ongoing monitoring are not usually associated with smaller systems found in domestic properties.

Unless the risk is high, most other rectification works can be undertaken during routine maintenance.

Fundamental control measures such as sanitising shower heads, hoses and inserts together with appropriate temperature control implementation will help reduce the build up of bacteria. Installing a tight fitting lid to header tanks will keep debris away and assist with the build up of biofilms.

Shared premises and residential accommodation – Landlords.

All water systems:

'The Law requires simple, proportionate and practical actions to be taken. Simple control measures **can help** manage the risk of exposure to Legionella and should be maintained.'

'Advising tenants about the risks, the control measures you are taking and the precautions they can take'

'Advising maintenance staff working on the system about the risks and how to minimise them.'

Remediation:

Water treatment and control programmes may need consideration.

'There is no single water treatment control regime that is effective in every case, and each control method has both benefits and limitations.'

Temperature regime and biocide treatments are commonly applied.

Thermal disinfection of hot water services is carried out by raising the temperature of the whole contents of the calorifier and circulating water for at least an hour.

Every hot water outlet throughout the system must then be flushed while the temperature at the calorifier is maintained sufficiently to deliver at 60c.

Taps should be run subsequently for 5 minutes at the full temperature and recorded.

Chlorine based solutions are widely used to disinfect water supplies. However it is rarely used continuously in domestic water at levels higher than 1.0 mg/l as this would render the water unpalatable and may lead to an unacceptable level of corrosion.

'After disinfection, and before the system is brought back online, the disinfectant should be completely flushed from the system.'

'To confirm effective disinfection, any required microbiological samples should be taken between two and seven days after the system is refilled.'

Reviews:

'Review your assessment at regular intervals, especially if any factors change, e.g. you change your disinfection regime, more vulnerable groups of people (e.g. the elderly) move into your premises.'

Records:

'Records, either written or electronic, should contain accurate information about who did the work and when it was carried out. All records should be signed, verified or authenticated by a signature or other appropriate means.'

These need to be held for 5 years.

'Landlords are not necessarily required to record the findings of the assessment (this is only a statutory duty for employers where there are five or more employees), but they may find it prudent to keep a record of what has been done for their own purposes.'

A legionella risk assessment is an ongoing process of record that is updated and referenced during property specific reviews. Properties need to be re-assessed when it is no longer valid.

Audit:

HSE provide free to download Audit checklists.

'These checklists are designed to help you, as the **person responsible**, audit the arrangements in place to control Legionella in the water systems in your premises.

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.'

The checklists are not risk assessments.'

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

Compliance:

To fully meet compliance, it is rarely a tick box exercise and ongoing reviews need to be maintained. Legionella bacteria exist naturally, and within systems feed off the natural build-up of deposits providing nutrients for growth. When conditions are favourable it can proliferate and colonise unnoticed.

Requirements differ according to system, building and use.

Although there are many factors to address **competency, overall is key.**

Basic systems that may be found in domestic properties do not necessarily require professional training or qualifications to undertake them. It is however important to understand how they operate and the influencing factors that encourage bacteria to grow.

An appropriate level of competency may be achieved to assess such systems through induction and awareness courses that are available. It is important to be aware that such courses do not provide the detail required as systems become more complex. As they do, professional training and experience should be sought.

Consequences:

In extreme cases and from domestic systems, contracting **Legionnaires' disease** can be fatal. If left unaddressed even **milder illness** can be suffered by the inhalation of contaminated vapour. **The Legionellaceae family** is considerable with 50 species, 70 serogroups and many strains. When analysed, **all species** need to be detected in the prescribed manner.

Fines can be imposed up to **£20,000 per offence**. **Personal litigation** can follow. In extreme cases charges of **corporate manslaughter** may be met.

As of 1st October 2015 in specific cases, landlords could find the serving of **section 21 notices to be invalid**.

If someone dies from Legionnaires' disease those responsible will have to demonstrate to a court that they have fulfilled their duties.

'HSE is only able to provide generic information on health and safety issues and cannot give specific advice on individual cases as the circumstances of each individual situation will be different. Ultimately only the courts can give an authoritative interpretation of the law when considering the application of the Health and Safety at Work Regulations (HSWA) and the Management of Health and Safety at Work Regulations (MHSWR)'.

INFLUENCING FACTORS

Although there are obvious signs that influence bacterial growth, such as water storage, insulation, temperature settings, build-up of biofilm and deposits, there are many other potential factors to consider. Some hidden and others, which although in isolation may not have an immediate impact, can affect the overall consideration especially when referencing the systems effective overall control and ability to deliver water safely. In basic systems where there is no stored water or aerosol producing assets the risk is inherently regarded as low.

As aerosol producing assets are identified risks increase and as systems become more complex, introducing other assets and especially when there are individuals present categorised 'At Risk'.

In such cases further attention for proper consideration is needed.

Such as:

- | | | | | |
|--------------------|--------------------|-------------------------|---------------------|-----------------------|
| ●Users | ●Sanitisation | ●External Assets | ●Pipe runs | Thermostatic Valves |
| Heat Exchangers | Biomass | ●Damaged Components | Secondary Returns | ●Time Settings |
| Excessive Cycling | Adequate Storage | Flow Patterns | ●Stagnation | ●Insulation |
| ●Servicing | ●Suitable Capacity | ●Stored Temperatures | ●Dead Legs | ●Back syphoning |
| ●Non return valves | ●System Design | ●Delivered Temperatures | ●Frequency of Use | Spring water Supplies |
| Pumps | ●Materials Used | ●Scald Risks | Flow & Return Rates | Spa & Whirlpools |
| ●Stratification | ●Dead Ends | Warm Pockets | ●Corrosion | Others etc. |

- Applies to all systems

Although not an exhaustive list to account for every case, most of the above considerations will apply to systems found in domestic properties. Regular cleansing and servicing is as important as use and addressing issues as they arise.

(Slides: Diagrams)

Dependant on the type of system, its complexity and use, other aspects will apply. The level of competence is key so as not to overlook influencing factors which need to be understood for proper consideration to determine outcomes. Subject to the outcome, appropriate measures can be put in place.

Theory

The theory itself is simple:

Keep the hot water hot and stored at 60°C, ensure it can be delivered at or above 50°C.

Keep the cold water cold and below 20°C, ensure it is being delivered no higher.

Keep water moving throughout the system.

Keep the system cleansed and free from build up of deposits.

Practice

Personal preferences to use differ and attention to influencing factors go overlooked.

As deposits naturally build up in all systems over time, they create the nutrients for bacteria to feed on. When conditions are favourable bacteria can colonise unnoticed.

It is important to regularly review assessments to ensure control measures remain effective.

Re-assess when necessary and especially when there are changes to the system or its use.

(Slides: Photo's)

EXAMPLE CASE STUDIES

Replacement Shower

Berkhamsted:

Following a complaint of a leaking shower from a flat owner below, it took some weeks to attend to the repair.

Water had been allowed to stagnate and within the higher ambient temperature within the building, the bacteria had flourished.

Having subsequently taken a shower the tenant reported he had been left with severe chest pains, coughing up blood and had to seek medical advice.

Bath Services

Nottingham:

In a larger more prestigious property that a group of medical professionals shared, the bath on the uppermost floor, served by a combination boiler, had not been used for some months.

The tenant that weekend ran the bath and was rendered temporarily incapacitated and bed ridden for two days.

The outcome was not just a result of infrequent use, the combination boiler was also found incapable of delivering safe temperatures to the bathroom as a result of the length of pipe run.

Fractured Diaphragm

Midlands:

Further to investigating the cause of a high count of bacteria from one part of the terrace property, it was also found colonising in another.

Only by the process of elimination was it identified to be thriving on a fractured diaphragm in the thermostatic shower located in the primary bathroom facility.

Non Return Valve

Kent:

A war veteran died in an upper floor flat having taken occupation some months earlier.

Investigations that followed found that the shower in the flat was pump assisted but without a non-return valve fitted.

Each time the shower was used warm water back syphoned into the header tank which in turn led the bacteria to flourish.

Hot Water Cylinder

East Midlands:

A tenant who was immunosuppressant had associated problems.

The findings of the risk assessment found no obvious flaws or defects and was accordingly classified as 'low'.

Water from the system was however analysed and found to have high concentrations of Legionella Pneumophila present.

The hot water cylinder was of an age, had a considerable build up of pseudomonas including Legionella species and limited to being heated according to use.

Unidentified

Croydon:

A tenant complained of severe flu like symptoms. Although he sought advice from his GP, his symptoms worsened shortly after and his wife rushed him into the local A&E.

He was diagnosed as having contracted Legionnaires disease.

He suffered side effects and was left with impaired vision which he is not thought to fully recover from. The investigating authorities could not determine the cause.

GENERAL

Outside Taps:

Typically connected to the mains cold supply under kitchen sinks, high counts of the bacteria are found when non return valves are not fitted.

Outside taps are infrequently used at times during the year and bacteria builds up. Back syphoning can occur.

Heat Exchangers:

Within instantaneously heated boilers these over time become less efficient.

As water passes through, deposits build up that transfer into the system as they begin to cycle when warm water is discharged.

The affect through cycling is that delivered temperatures are not constant and thermal control becomes ineffective. It is generally accepted that heat exchangers have an active life span of 8 to 10 years.

Biomasses:

Can build up anywhere in all systems, hidden and unnoticed.

As they break down or are disturbed bacteria which feeds upon them is released.

Insulation:

Plays an important role maintaining preferential temperatures to control the growth of bacteria in both pipework and storage units.

Ambient temperatures vary according to seasonal changes as well as system use.

Excessive pipe runs:

When warm water travels from the heat source it cools before reaching its used destination.

Conversely cold water warms as it is delivered from the mains supply.

As the length of pipe run between assets and sentinels increase, thermal control becomes less efficient and can encourage growth.

Dead Ends:

More commonly found in older properties, these also exist in newer builds.

Some are obvious where installations have been changed and the redundant pipework exposed.

Many are found hidden and concealed in floor and roof voids, some within the plastered fabric of walls.

It is possible to identify those hidden by taking temperatures at strategic points.

Sanitation:

Simple fundamental control measures can be put in place which are proven to be successful in achieving a front line defence to control the bacteria in basic systems found in domestic properties.

They do not constitute the full extent of such measures but are important to apply routinely:

Chlorination of shower heads and hoses, wastes and cisterns. Sanitation of taps and temperature control implementation.

Tenants whilst in occupation have the responsibility thereafter and should be advised of the importance maintaining cleanliness and flushing seldom used facilities.

ASSESSMENTS

All systems, no matter how basic will have influences known to be causative factors which need to be taken into account.

The risk in many domestic systems is generally considered low and in those cases where it is found to be, there is no need for an in-depth or overly detailed assessment, but proper consideration needs to be given to all principle factors.

There can be numerous other aspects to both assess and consider especially as systems become more complex.

If a flaw is found it does not necessarily mean water is not being delivered safely, matters that arise can be more appropriately addressed during routine maintenance.

Assessments need to be undertaken with the level of competency applied to the system and use, so as not to miss extremes and for proper consideration for practicable and proportionate measures to be undertaken when necessary.

(Slides: Pie Charts)

FUNDAMENTAL CONTROL MEASURES

Proper chlorination of shower heads, hoses, wastes and cisterns; the sanitisation of taps, inserts and mixers together with temperature control dramatically reduce the ability for bacteria to grow.

During empty periods and where there are seldom used facilities, water should not be allowed to stagnate. A programme of weekly flushing to avoid stagnation should be implemented, or consideration given to draining down the system during prolonged periods.

Outside facilities should not be overlooked.

WATER ANALYSIS

Although there is no specific legal requirement for water to be analysed from systems within domestic properties, there are cases where this will be found appropriate and necessary for consideration.

It is the only means to confirm levels of bacteria present and may be found pinnacle in support of the assessment.

From our data recorded over the many thousands of trials carried out across the UK to date, there have been unexpected results, especially found in more basic systems when left unaddressed.

It does not necessarily follow where high counts are present that individuals will actually fall ill in every case. In specific cases, water analysis is instrumental to correctly diagnose appropriate action.

It is important to address any foreseeable likelihood to exposure and act accordingly at all times.