



# HSG282

## - Control of legionella and other infectious agents in spa-pool systems

Spa pool waters are often identified as a source of disease caused by infectious agents including Legionnaires' disease, primarily *Legionella pneumophila*. In recent years there have been a number of outbreaks linked to recreational pools in leisure centres, hotels, holiday homes and cruise liners.

The guidance HSG282 published by The Health and Safety Executive is primarily for individuals who manage or control spa-pools and explains how to manage and control the risks from legionella and other infectious agents. This guidance has been designed to help service suppliers, designers, manufacturers, importers, suppliers and installers of spa-pool systems to meet their legal requirements. The guidance HSG282 provides specific information on the health and safety law that applies. General duties under the Health and Safety at Work ACT 1974 extend to risks from legionella bacteria and other infectious agents which may arise from work activities.

A spa pool is a self-contained body of warm moving water designed for sitting or lying in and not for swimming or total body immersion. The water is usually heated between 30-40°C, which is filtered and chemically disinfected. Spa pools have a much higher ratio of bathers to water volume than in swimming pools, so their water has a higher concentration of organic material from bathers. The air-jet

circulation system can produce aerosols, and these systems pose a reasonably foreseeable risk that could potentially allow, support growth and dispersion of infectious agents. The organism that cause legionnaire's disease, primarily *Legionella pneumophila*, frequently grows in poorly designed and managed systems. Other bacteria including other legionella species, *Pseudomonas aeruginosa* and environmental mycobacteria can also be found in these waters. These may be either introduced by the bather or from the source itself. Spa-pool systems must be managed carefully to ensure water quality does not encourage microbial growth and pose risks to any pool users.

### Chemical testing

The frequency and extent of the chemical testing needs to be determined by a risk assessment. The testing should be done when the air-jets are not in operation and after maximum use to ensure the treatments being used are satisfactory. Most testing can be done poolside but some specialised testing will be required by analysis at a laboratory and this is where ALS can help. ALS can analyse for all the tests below.

Chemical Test	Range	Recommended Action
pH	7.0 – 7.6	None
	<7.0 or >7.6	<ul style="list-style-type: none"> <li>Close the pool and check the operation and calibration of acid/alkali dosing units.</li> <li>Recheck if any faults have been discovered. If pH still not within limits the pool should be emptied and refilled with fresh water and pH corrected if necessary.</li> </ul>
Disinfectant	Chlorine 3 – 5mg/l Bromine 4 – 6mg/l	None
	Chlorine <1mg/l or >10mg/l Bromine <2mg/l or >12mg/l	Close the pool, choose and apply corrective actions and then retest for new levels
	Chlorine 1 – 2 or 6 – 10 mg/l Bromine 2 - 3mg/l or 7 - 12mg/l	<ul style="list-style-type: none"> <li>Check dosing units are working correctly.</li> <li>High levels can be decreased by partial water replacement if the fault has been rectified.</li> <li>Low levels can be increased by 'shock dosing' of pool water if the fault has been rectified.</li> </ul>
Combined chlorine	<1mg/l	None
	>1mg/l	<ul style="list-style-type: none"> <li>Check dosing units are working correctly.</li> <li>High levels can be decreased by partial water replacement if the fault has been rectified.</li> </ul>
Total dissolved solids (TDS)	Should not be more than 1000mg/l greater than the incoming water	None
	>1000mg/l greater than the incoming water	<ul style="list-style-type: none"> <li>Check dosing units are working correctly.</li> <li>Empty pool and re-fill.</li> </ul>

## Microbiology Testing

The frequency and extent of the microbiological sampling of the spa pool should be determined by a risk assessment. Monthly Total Viable Coliforms, coliforms, E coli and Pseudomonas aeruginosa and quarterly for legionella. Sampling should be done when the pool is in use and being heavily used or straight afterwards. Sampling for legionella should be carried out in accordance with BS 7592. The laboratory performing the tests should be accredited by the United Kingdom Accreditation Service (UKAS) to EN ISO 17025. ALS have these accreditations and can carry out all the analysis below.

Microbiological Test	Range	Action
Total Viable coliforms (TVC)	>10 cfu/ml	If the TVC result is >10 cfu/ml and the residual disinfectant and pH values are satisfactory the water should be re-sampled and re-analysed.
	>100 cfu/ml	Check the treatment system and all testing results records immediately. Implement remedial action, re-sample and re-test.
Coliforms and E coli	>1 cfu/100ml	Occasionally positive samples will occur if the pool has been sampled immediately after contamination. This may happen if the disinfection system hasn't had chance to take effect. A repeat sample will need to be taken whenever coliforms have been detected in the pool.
	≤10 cfu/100ml	A coliform count of up to 10 cfu/100ml is acceptable if the disinfectant and pH values are within the ranges required and there are no E coli present and the TVC count is <10 cfu/ml.
	Present on repeat test or if >10 cfu/100ml at any time	<ul style="list-style-type: none"> <li>Indicates that disinfectant regime is ineffective</li> <li>Close the pool</li> <li>Shock dose the pool with 50mg/l chlorine circulating for 1 hour or equivalent</li> <li>Drain, clean and disinfect</li> <li>Review the control measures and re-assess the risk assessment.</li> <li>Carry out remedial actions</li> <li>Refill, disinfect and adjust pH to recommended range. Retest next day and 2-4 weeks later</li> </ul>
Pseudomonas aeruginosa	Present 10-50 cfu/100ml with or without raised coliform, E coli or colony count	<ul style="list-style-type: none"> <li>Take a repeat sample for testing</li> <li>Scrub walls of balance tank, if applicable, and clean the filter</li> <li>Chlorinate to 10mg/l free chlorine, circulate and then flush</li> <li>If repeat sample is still showing P aeruginosa the filtration and disinfection processes must be examined to determine where multiplication has taken place</li> </ul>
	>50 cfu/100ml with or without raised coliform, E coli or colony count	<ul style="list-style-type: none"> <li>Close pool</li> <li>Shock dose the pool and balance tank, if applicable, with 50mg/l free chlorine circulating for 1 hour or equivalent and flush through</li> <li>Drain, clean and disinfect</li> <li>Review the control measures and re-assess the risk assessment</li> <li>Carry out remedial actions identified</li> <li>Refill, disinfect and adjust pH to recommended range. Retest next day and 2-4 weeks later</li> </ul>
Legionella	<100 cfu/l	Under control but maintain control measures
	>100cfu/l and up to 1000 cfu/l	<ul style="list-style-type: none"> <li>Resample and keep under review</li> <li>Review the control measures and re-assess the risk assessment</li> <li>Carry out remedial actions identified as necessary</li> </ul>
	>1000 cfu/l	<ul style="list-style-type: none"> <li>Immediate closure of pool and restrict public from the pool area</li> <li>Shock dose the pool with 50 mg/l free chlorine circulating for 1 hour or equivalent</li> <li>Drain, clean and disinfect</li> <li>Review the control measures and re-assess the risk assessment</li> <li>Carry out remedial actions identified as necessary</li> <li>Refill, disinfect and adjust pH to recommended range. Retest next day and 2-4 weeks later</li> </ul>

ALS Environmental are the pioneers in Maldi-ToF confirmations for these and other microbiological organisms and have full UKAS ISO 17025 accreditation on these tests. We are also compliant to ACoP L8, HSG 274 and HTM04-01 and we are able to save 2 days on positive Legionella results.

ALS Environmental are members of the Legionella Control Association (LCA) and have members of the Water Management Society (WMSoc) throughout our business. With our experience and expertise within this sector, we can fulfil all your pool testing requirements to ensure your pool is healthy and safe.