

LEGIONELLA

L8 WEEKLY

Legionella bacteria can survive under a wide variety of environmental conditions and have been found in water at temperatures between 6°C and 60°C. Water temperatures in the range of 20°C to 45°C seem to favor growth. The organisms do not appear to multiply below 20°C and will not survive above 60°C.

Legionella bacteria can colonise manufactured water systems and be found in cooling tower systems, hot and cold water systems and other plant which use or store water. To reduce the possibility of creating conditions in which the risk from exposure to legionella bacteria is increased, it is important to control the risk by introducing measures which:

- (a) Do not allow proliferation of the organisms in the water systems; and
- (b) Reduce, as far as reasonably practicable, exposure to water droplets and aerosol.

Examples of systems at risk:

- *Cooling towers & evaporative condensers*
- *Hot & cold water systems, especially those incorporating showers*
- *Spa & whirlpool baths*
- *Hot tubs*
- *Indoor fountains & water features*
- *Horticultural misting systems*
- *Emergency showers and eye wash sprays*
- *Car/bus washes*

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UK guidelines published by the HSE (Health and Safety Executive): “Legionnaires' disease. The control of legionella bacteria in water systems” - Approved Code of Practice and guidance – commonly called L8 were produced to give guidance on the control of legionella bacteria in water systems.

Cooling Water Monitoring

This test kit includes the recommended key parameters that should be measured on a weekly basis to minimise the risk of *Legionella* proliferating to harmful levels in open cooling water systems. The test kit DOES NOT test for *Legionella* bacteria itself but instead test for the conditions to control legionella growth. The kit is designed to be used on systems treated with bromine as the oxidising biocide.

Tests supplied are as follows:

1. Bromine (Checkit comparator)
2. pH (test strips)
3. Aerobic bacteria (dip-slide)
4. Conductivity (SD70 meter)



DI-10 Incubator

Notes

1. The SD70 conductivity meter will also measure temperature to enable hot and cold water temperatures to be taken.
2. If results from dipslide analysis are to be meaningful, it is essential to keep all analysis conditions identical, week on week. This allows for trending of results so that any significant increases in bacteria levels can be observed and acted upon. Inconsistent temperature or timing means results cannot be compared so trending is impossible. The Lovibond **DI-10 Incubator** is a compact, low voltage unit capable of holding 12 dipslides and when combined with dipslides make an excellent analytical pair.

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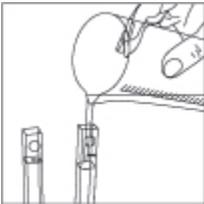
Bromine (Total)

Bromine is an effective oxidising biocide for cooling water treatment, provided that careful pH control is maintained. Your water treatment contractor will advise suitable control concentrations to maintain. Use the following test to check this concentration weekly and log the results. Both free and combined forms of bromine are biocidal.

Bromine Total - (Free and Combined)

- Fill both cells to the 10 ml mark and place one cell in the left-hand compartment of the comparator as a blank.
- Add one **DPD No.1** tablet in the other cell, cap the cell swirl it until the tablet has dissolved.
- Place this second cell in the right-hand compartment of the comparator and match the two colour fields against north day light
- Read off the result as mg/l total bromine.

1



3



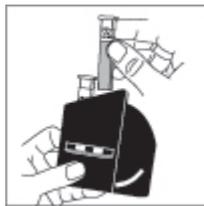
5



2



4



Note: To remove any chlorine that may be present, add one **DPD Glycine tablet** (not supplied as standard) before the DPD No.1 tablet and crush to dissolve.

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pH (Test Strips)

The effectiveness of the oxidising biocide is pH dependant. So ensuring correct pH control of cooling water is essential to ensure maximum biocide efficiency. Test strips are supplied for pH determination. An optional pH meter is available if greater accuracy is required.

Procedure

1. Remove one test strip from the pack and dip into the cooling water for a few seconds.
2. Remove and compare the colours produced on the test strip pads with the colour scale on the outside of the pack
3. Read off the pH value that corresponds to the nearest matching set of colours.

Aerobic Bacteria

Diplslide analysis of water for microbiological contamination is the recommended method for monitoring cooling water for aerobic bacterial growth. Maintaining low counts via diplslide measurement shows that the pH and biocidal control systems in place are working correctly. Any significant increases in results should be acted upon immediately to prevent proliferation to harmful levels. Cooling water is deemed to be "in control" if the diplslide reading is 10^4 cfu/ml or lower.

Notes

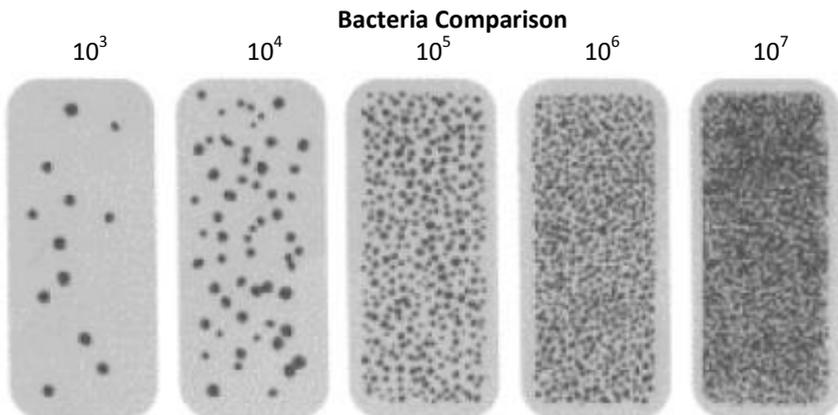
There are some fundamental steps to ensure that the results obtained are meaningful and can be used to evaluate system control.

1. Prevent contamination of the agar by washing hands thoroughly
2. Ensure that the diplslide is incubate at the correct temperature and not exposed to excessive heat throughout the incubation (or this could thermally shock the bacteria preventing growth).
3. Ensure the incubation temperature is constant through the 48 hour period.
4. Ensure that the incubation time is consistent test on test, week on week.

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Procedure

1. Withdraw the dip slide from the tube without touching the agar surface. Dip the slide into the liquid or wet the slide under a running stream of fluid. Both sides of the dip slide should become completely wet. The dip slide must be in contact with the fluid to be examined for about 5 – 10 seconds.
2. Allow excess fluid to drain off the slide. .
3. Replace the dip slide back into the tube and label as required with the enclosed labels.
4. Place the dip slide in an incubator at 30°C for 48 hours.
5. After incubation remove slide from tube and compare the red spot growth on agar strips to the following comparison chart.
6. Use a strong bleach solution to sterilise the used dip slides, before disposal.



Notes: Dip slides have a typical shelf life of 6 - 9 months and should ideally be stored at 15°C. After use the dip slide should be incinerated, autoclaved or soaked in disinfectant for several hours before disposal.

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Conductivity (SD70 Meter)

An SD70 conductivity meter is supplied to measure water conductivity. Multiplying the result by 0.7 will convert the reading to total dissolved solids (TDS). Temperature is displayed directly on screen during pH measurement.

Quick Start Guide:

(For full features, see the instruction booklet supplied)



Press and hold for 3 seconds to turn off.



Press to hold reading - (!) appears on LCD



Press for backlight on/off



Press for 3 seconds to store data

After 3 sec. appears shortly the file no. on the display, e.g. 01.
Once the storage has reached maximum capacity, the data will overwrite the oldest files.

- * Re-Calibrate regularly to maintain accuracy.
- * Rinse the electrode with distilled water after each reading.
- * If temperature is out of range, "ERR" will appear, then return to measurement mode automatically.
- * If the default reading is more than 30% off compare to the standard buffer, "ERR" will appear.



Calibration

Auto-recognition for 1413 μ S and 12.88mS

3 sec



Press "Cal" for 3 seconds - Then Press
(CAL with blink in LCD)



Wait for CAL to disappear

The instrument is now calibrated. Rinse with a small quantity of sample water then immerse the probe in sample water to display the conductivity result.