Legionnaires’ Disease
Can you catch Legionnaires’ disease from an EcoCooling Evaporative Cooler?
No, because the circulating water is less than 20°C and no droplets are formed.

Has anyone ever caught Legionnaires’ disease from an evaporative cooler?
There have never been any cases of Legionnaires’ disease attributed to a wetted media evaporative cooler. It is believed there are over 30 million installations worldwide.
Legionnaires’ disease is a form of pneumonia. It is contracted by breathing in very small droplets of water contaminated by legionella bacteria.

It is estimated that there are over 30 million evaporative coolers world-wide [1] and there has never been a case of Legionnaires’ disease attributed to a wetted media evaporative cooler [2].

UK legislation regarding Legionnaires’ disease is contained in an HSC guide called Approved Code of Practice (ACOP) Legionnaires’ Disease: The control of legionella bacteria in water systems L8.

The key reasons why an EcoCooling evaporative cooler is safe are:

Avoidance of stagnant water
◇ The coolers automatically drain when not in use
Low water operating temperature
◇ The temperature of the water rarely goes above 20°C
Avoidance of corrosion and scaling
◇ There is a water management system which prevents scale
◇ All water contact surfaces are plastic
Use of a biocide
◇ There is the option of using bromine as a biocide
No production of aerosols
◇ The air velocity over the pads is too slow to create carry over
Maintenance
◇ The units are maintained by qualified personnel
Legislation

- **ACOP L8** stipulates that a risk assessment must be carried out
- A risk assessment should look at each stage of the pathway to infection
- From this assessment a judgement can be made on the level of risk
- When a systematic risk assessment is carried out on an EcoCooler it is, if installed, commissioned, operated and maintained in accordance with EcoCooling instructions, considered a LOW RISK device

A wetted media evaporative cooler does not have to be registered with regard to the Notification of Cooling Towers and Evaporative Condensers Regulations. A wetted media evaporative does not fit into the classification of a Cooling Tower or Evaporative condenser.

- Definitions according to ACoP L8
  - Cooling tower – an apparatus through which warm water is discharged against an air stream: in doing so part of the water is evaporated to saturated the air and this cools the water. The cooler water is usually pumped to a heat exchanger and recycled through the tower
  - Evaporative condenser – A heat exchanger in which refrigerant is condensed by a combination of air movement and water sprays over its surface
Legionnaires' disease is a type of pneumonia. It was named after an outbreak of severe pneumonia which affected a meeting of the American Legion in 1976. It is an uncommon but serious disease.
What is Legionnaires’ Disease

How do people catch it?

- The germ which causes legionnaires’ disease is a bacterium called Legionella Pneumophila.
- People catch legionnaires’ disease by inhaling small droplets of water suspended in the air which contain the Legionella bacterium.
The Pathway to Infection

1. Presence in Water Supply
   - Legionella must be present to start the pathway

2. Growth to dangerous levels
   - Suitable temperature conditions and nutrients must exist for the legionella to reproduce to levels which could cause infection

3. Production of droplets
   - Water droplets, contaminated with legionella, must be produced. The critical droplet size for infection to occur appears to be between 2 and 5 microns.

4. Inhalation by Susceptible Host
   - The contaminated droplets must be inhaled deep into the lungs. Only 5% of the population are susceptible. Age, health, sex and smoking are factors
1. To perform a risk assessment each stage of the pathway should be examined.

2. From this examination an assessment should be made of the possibility of the pathway being viable.

3. This risk assessment should take into account the standard prevention and control measures inherent in the process design of an EcoCooler.
**Stage 1—Presence in Water Supply**

- Always use potable mains water
- Do not use any water which may be contaminated
  - Rainwater
  - Reclaimed water

From the above it can be concluded that this stage is **LOW RISK** as the level of ‘seeding’ of the system is low.
Risk Assessment

Presence in Water Supply

Growth to dangerous levels

Production of droplets

Inhalation by Susceptible Host

LOW RISK
Stage 2 – Growth to dangerous levels

- Legionella bacteria need the correct temperature and nutrients to grow

Temperature

- The water in an EcoCooler circulates at the ‘Wet Bulb’ temperature of the air
- In the UK this rarely approaches 20°C
- Below 20°C legionella is considered dormant

Stage 2 – Growth to dangerous levels
Temperature

- Below is a temperature sampling of an Evaporative cooler in the UK
- It can be seen that the water temperature does not reach dangerous levels – even at very high ambient temperatures
Risk Assessment

Stage 2 – Growth to dangerous levels

Nutrients

- All wetted surfaces, with the exception of the CELdek pads, are plastic and so do not degrade to create nutrients
- The pads are treated to stop rotting
- During operation the cooler is regularly drained and flushed to remove particles which have been filtered out of the air
- A salinity control system prevents scale formation. Scale breakdown could provide nutrition and so this is avoided

From the above it can be concluded that this stage is **LOW RISK**
Risk Assessment

Presence in Water Supply

Growth to dangerous levels

Production of droplets

Inhalation by Susceptible Host

LOW RISK

LOW RISK

LOW RISK
Risk Assessment

Stage 3 – Production of Droplets

- A wetted media evaporative cooler does not create droplets provided the air velocity over the pads does not exceed a set limit.
- For Munters CÆLdek pads the maximum face velocity is 3m/s.
- An EcoCooler maximum face velocity is 1.7m/s.
- The design of an EcoCooler ensures no droplets are produced.
- Fan or Pad specifications must not be changed without being validated.
- From the above it can be concluded that this stage is LOW RISK.
Risk Assessment

Presence in Water Supply

Growth to dangerous levels

Production of droplets

Inhalation by Susceptible Host

LOW RISK

LOW RISK

LOW RISK
Risk Assessment

Stage 4 – Inhalation by Susceptible Host

- It is impossible to determine which areas of the population may be exposed to an evaporative cooler.
- It is therefore impossible to perform a risk assessment on this stage.
Risk Assessment

- Presence in Water Supply: LOW RISK
- Growth to dangerous levels: LOW RISK
- Production of droplets: LOW RISK
- Inhalation by Susceptible Host: UNKNOWN
Generic Risk Assessment

- Since the first three stages of the pathway can be considered low risk then the total risk can be assessed as low
- This is only valid if the EcoCooler is installed, commissioned, operated and maintained in accordance with EcoCooling Guidelines
Contact

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Supporting Documents

EcoCooler Risk Assessment
- Detailed risk assessment of the hardware and software.
- Authored by Dr Tom Makin, co-author of ACoPL8 and NHS guidelines

EcoCooling Risk Assessment Information Pack
- Support ACoPL8 nominated ‘Responsible Person’ in performance of a site-specific risk assessment