



# Water treatment for legionella and bio-film prevention in

- Hotels
- Hospitals
- Office blocks
- Nursing homes
- District heating systems
- Military establishments
- Water features
- Cooling towers and evaporators



# Legionella Pneumophila



Legionella has been identified as a major problem in multioccupancy buildings such as hotels, hospitals, hostels, schools, military establishments, nursing homes and office blocks.

Worldwide thousands of people become seriously ill or die through infection by this potentially deadly disease. The costs if a buildings water system becomes infected can be substantial not only in terms of human suffering but also financially.

If a hotel is identified as a source of infection it can result in forced closure whilst the problem is treated plus possible lawsuits if people are infected. This means substantial loss of revenues and reputation. In addition in many countries if it is shown that the problem occurred due to the negligence of the hotel operators and staff it can result in large financial penalties or even prison sentences for the individuals concerned.

Every year hotels throughout the world are forced to close due to this problem often in the height of the tourist season.

Every year people die in hospitals not from the disease that they were being treated for but from infection by this deadly bacteria that they contracted from the hospitals water system.

Due to the soaring price of energy many operators of these buildings reduce the overall temperature of the hot water system which can increase the risk of infection by the legionella bacterium.

Danish Clean Water disinfectant generators can be installed in all these buildings to treat the water system on a continual basis not only to remove the infection but to minimize the risk of reinfection.

A Danish Clean Water disinfectant generator gives the building operator peace of mind that he is doing everything possible to protect the users of the building from infection and consequently minimizes the risk to themselves financially and legally.



**Disclaimer:** The stock photographs used in this publication are to illustrate the types of buildings that may be treated with DCW technology. There is no intention implied or otherwise to indicate that these buildings are infected with legionella.



*Biofilm forming*

# All about Legionella

Legionella pneumophila was first identified in the mid seventies as an infectious disease after an outbreak at a legionnaires conference in the United States. Over 200 people were infected and 34 died.

Infection is by inhalation of aerosols of infected water from sources such as showers, cooling towers and water features.

The susceptible groups are the elderly or those with an underlying medical condition that may be affecting their immune system.

Fatality rates are largely dependant on the speed with which the disease is identified and antibiotics administered but are typically between 5-30%.

The bacterium can also cause a milder infection known as Pontiac Fever which normally a healthy person will recover from without treatment within a few days.

The bacteria can survive temperatures up to 50 deg C but is generally killed at temperatures over 60 deg C.

Temperatures of between 30 and 45 deg C provide the optimum growth conditions for the bacterium.

The bacterium can infect protozoa which live in biofilms that accumulate on the surfaces of pipework systems.

Pipework that has biofilms on the surface are ideal breeding grounds for the bacteria.

Removal of biofilms and maintaining a high ORP has been shown to be an effective strategy for minimizing the risk of potential legionella infection.

Danish Clean Water generators produce a disinfectant that will remove biofilms, kill legionella bacterium and maintain a high ORP within the system.

Danish Clean Water technology is approved by the German DVGW in Worksheet 229 for the treatment of potable water.

Research carried out at Bonn University clearly demonstrates that our technology is extremely effective at removing Bio-films.

**No biofilm = No legionella**

# The Technology & The Solution

DCW disinfectant generators are produced in a range of capacities to suit most applications. They have been designed to meet the specific requirements of a wide range of applications.

The T10 generator was specifically developed for use in multi-occupancy buildings where the water consumption is up to 1,000 cubic meters per day. This would normally be sufficient for most hotels, hospitals, offices and nursing homes. For larger volumes the T25 range would be capable of treating up to 5,000 cubic meters per day.

The added benefit of using DCW technology is that as well as removing the biofilm and killing the

legionella bacteria it will also kill most other water borne pathogens.

DCW disinfectant generators can be easily installed in most plant rooms with a few simple connections and can be commissioned within a few hours. DCW normally carry units in stock for emergency situations where legionella or other waterborne pathogens have been identified and urgent remediation is necessary. Working with our partners in many countries we can offer a speedy response to solve the immediate problem and reduce the risk of re-infection.

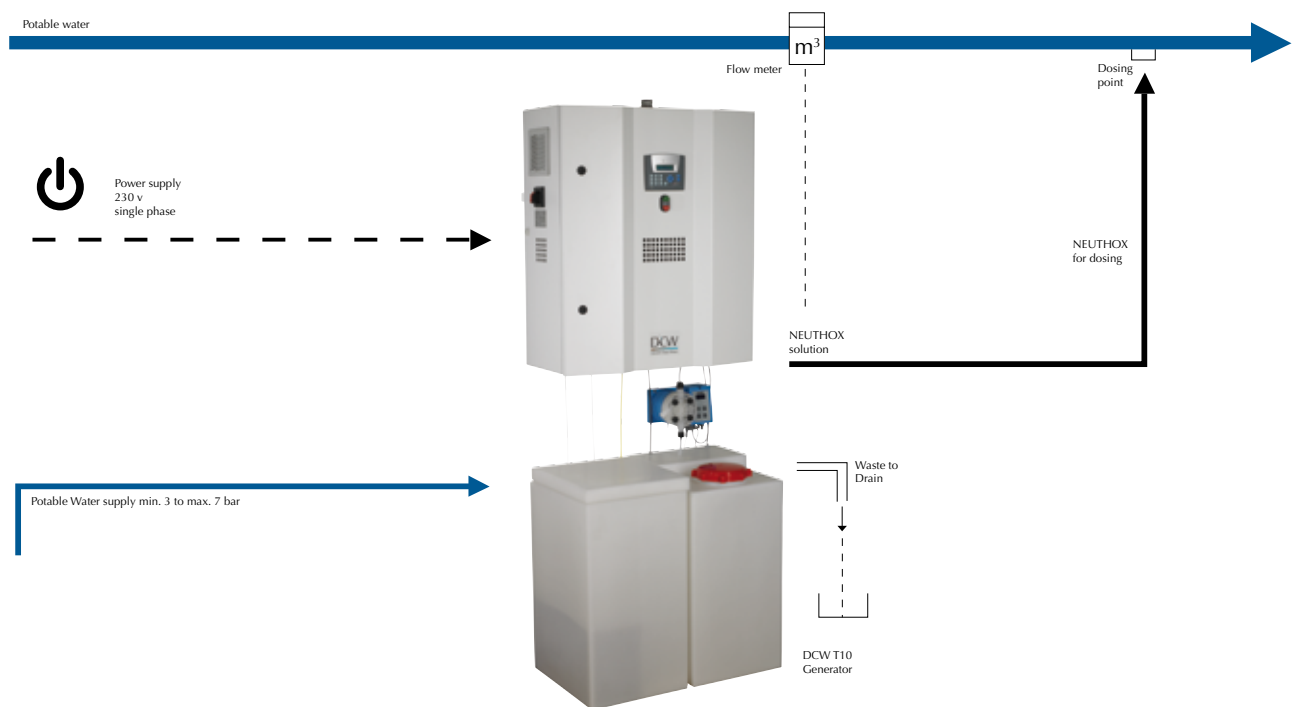
DCW disinfectant generators use only common salt and a little electric power and typically have

a water treatment cost of less than 0.5 cent per cubic meter.

The generators require a minimum of human intervention and it is only necessary to keep the salt tank filled, typically a 1-3 times per month task.

As well as for potable water treatment the technology can be applied to cooling towers and evaporators to prevent legionella and other aerosol borne pathogens being discharged.

A typical layout for treating potable and hot water is shown below.



# Technical specifications for T10 Disinfectant generator


## Data table

Generator type		T10N0015	T10N0030	T10N0050
Neuthox production	Litre/hour	15	30	50
Free Chlorine	mg/Litre	500	500	500
Approximate salt consumption*	kg/day	0,9	1,8	3,0
Electric connections (single phase)	V	1 x 230	1 x 230	1 x 230
Fuse protection	A	10	10	10
Power	W	300	800	1100
Brine tank	Litre	100	100	100
Storage tank	Litre	100	100	100
Room ventilation	m <sup>3</sup> /h	10	18	27
Ambient temperature	°C	+5 to +40	+5 to +40	+5 to +40
SIZE: 708mm (width) X 840mm (height) X 333mm (depth)				

\* 15 hours running time per day

For T25 specifications request a copy of our technical brochure.

## Comparison of technologies

Commonly used technology	UV	Sodium Hypochlorite	Chlorine Dioxide	Ozone	Silver Nano Particles	
Prophylactic effect	No	Yes	Yes	Limited	Yes	Yes
Destroys biofilms	No	Limited	Yes	Limited	Limited	Yes
Safe for operators	Yes	No	No	Yes	Yes	Yes
Effective against legionella colonization	No	Yes	Yes	Limited	Yes	Yes
Environmentally safe	Yes	Yes	Yes	Yes	Strong concerns	Yes

**USES ONLY COMMON SALT  
NO DANGEROUS CHEMICALS TO HANDLE**

# Why use Danish Clean Water technology



When compared to other water treatment technologies DCW disinfectant generators have many significant advantages.

- Destroys bio-films
- Maintains a hygienic water system
- Has a prophylactic effect to prevent recolonization
- Highly cost effective, as little as 5€ to treat 1000 cubic meters of water
- Safe, no dangerous chemicals to handle
- Low maintenance equipment
- Minimum of human intervention required
- Fully automated
- Eliminate legionella



**DCW technology protecting people**



# About Danish Clean Water

Danish Clean Water operates from the *Danfoss* industrial estate in Southern Denmark. Under the trusted by Danfoss scheme it has access to the full range of Danfoss facilities including laboratories and engineering.



Danish Clean Water sells and installs its units mainly through a network of partners throughout many European countries. This ensures that our end use customers get the best possible service and advice. We are always interested in talking to new potential partners with the relevant competencies in areas or industries where we do not have representation.

Danish Clean Water disinfectant generators have been installed in many applications such as:

- Hospital
- Potable water plant
- Multi-occupancy building
- Process water plant in food industry
- Dairy
- Cooling tower
- Bottling line
- Decorative water feature

- Swimming pool
- Animal drinking water
- Waste water plant
- Office Block
- Care home

Visits to our facility from prospective customers and partners are always welcome. In addition we have a number of installations a short distance from our offices where you can see our technology in action.

**Some of our customers:**

Heinz  
Carlsberg  
Arla  
British National Health service  
Callebaut  
Danfoss



*“Our mission is to provide cost effective,  
safe, environmentally responsible  
solutions to bacterial control  
in the food and water industries”*



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