

WATER TREATMENT

By Sofchem Sarl.

The French specialist





The company

Sofchem is a leader in ionic water treatment systems in Europe and Canada, and has been at the forefront of water technology for over 15 years.

Our philosophy: reduce or eliminate chemicals, safer water, better environment.



Water

- Water is one of the two most important elements of life on earth (the other one being AIR). With world population growth and industrialization, it is also one of the most fragile and endangered substances on earth. Increased consumption, population density, and industrial discharge are polluting the world's water sources. In heavily industrialized areas, major rivers are extremely polluted. A report published in China last year stated that water in most parts of the Yangze and Huanghe rivers were totally unsuitable for domestic use.



One Philosophy, One Goal

It is everyone's concern and duty to fight pollution, save our environment and our water resources. Sofchem's philosophy is to reduce or eliminate chemicals, produce safe water and a better environment.



The Methods

Methods to reach these goals are limited:

- Control of water consumption.
- Water recycling.
- Filtration and reverse osmosis.
- Ionization.



Sofchem - Scope

Sofchem mainly focuses on IONIZATION

To this day, Ionization is the only method that kills waterborne pathogens without any chemicals.

Ionized water

A technology breakthrough





Ionization in simple terms

It's been known for centuries that ions of silver and copper are able to destroy waterborne pathogens. However it's only recently that man managed to control water ionization with modern technology.

The first experiments were done 30 years ago by the NASA during the Apollo space program, and Ionization has been used industrially in Europe and the USA for over 20 years.

How does it work?

Ionization is basically electrolysis of water.

Water is passed through copper and silver cells. The cells are powered with low voltage DC that creates an electromagnetic field between electrodes and releases ions in the water. Copper softens the bacteria's outside shell and silver kills the bacteria's DNA. Testing has shown that a combination of copper/silver cells and UV radiation is even more efficient, and destroys the whole range of waterborne bacteria.



The dangers of water



The dangers of water

The WHO lists 29 dangerous waterborne pathogens including bacteria, viruses, protozoa, and helminthes. The most common pathogens are:

- E-coli
- Cryptosporidium
- Salmonella
- Legionella
- Cholera
- Hepatitis A & E
- Enteroviruses

The dangers of water

- These germs are carried and transmitted through water by ingestion or contact with mucous membranes. Some can also become airborne by cooling towers, and spread upon wide areas.
- Legionnaire's Disease, possibly the most commonly known water borne pathogen, is a potentially fatal pneumonia caused by Legionella bacteria. Legionella has caused and continues to cause epidemics worldwide through the use of badly sanitized water cooling towers, hot water systems, swimming pools, water treatment plants and water storage facilities.
- A national UK survey carried out by the Public Health Laboratory Service (now known as the Health Protection Agency) found Legionella bacteria contamination present in the domestic hot water systems of 75% of business premises, 70% of hospitals and more than 50% of hotels.
- European governments have now issued strict laws regarding the control of Legionella.
- For a list of recent reported cases view :

<http://www.hcinfo.com/outbreaks-news.htm>

Legionella

A fatal waterborne bacteria

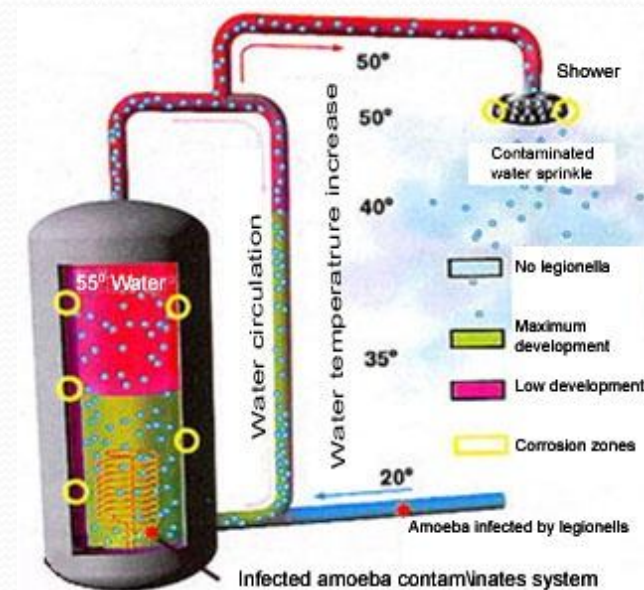


How does it spread

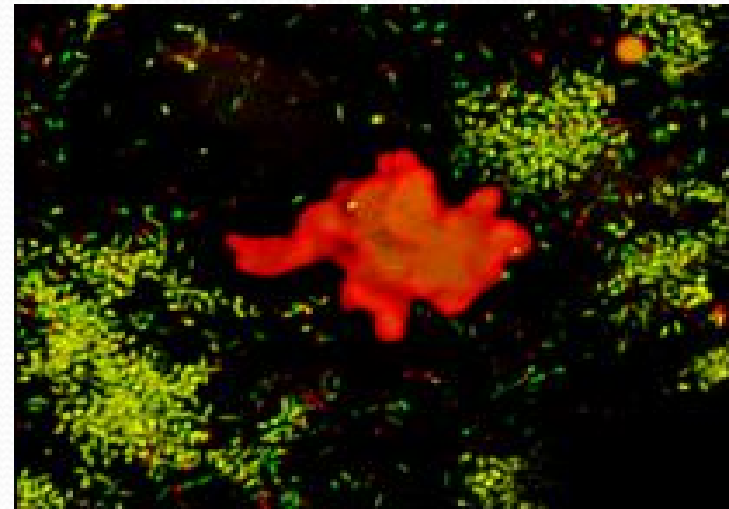
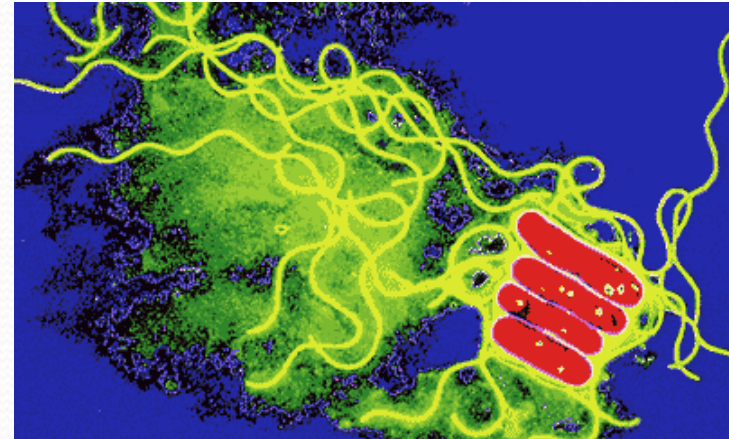
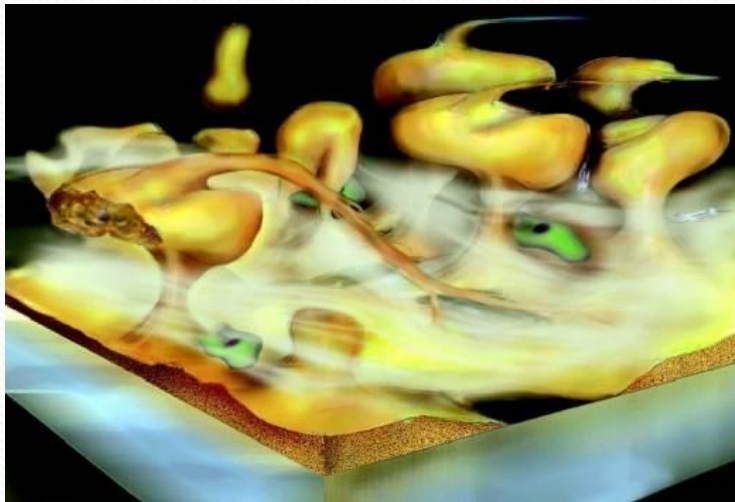
Legionella is a –gram bacillus that develops in natural or artificial waters. They can be found in mud, streams, and water ducts.

There are several types of Legionella; the most dangerous is a type 1 serogroup, *Legionella Pneumophila*, as it causes Legionnaires Disease, a fatal pneumonia.

- The 3 main development agents are:
- Temperatures between 25°C and 45°C.
- Slow water circulation and stagnant waters and ducting.
- Ducting material (calcium, porosity and corrosion)

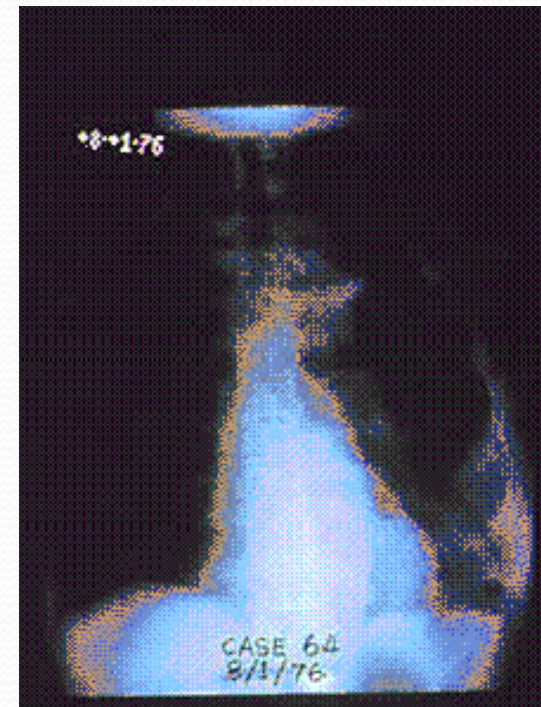


Legionella is very resistant to typical water treatments because it often spread inside amoeba (in red) or protozoa, and develop mainly in biofilms (in yellow) where they are protected from typical biocides.



The legionnaire disease

- Legionnaire is an infection of respiratory tracts that comes either as the benign form called Pontiac fever, or as a serious respiratory infection with an incubation of 2 to 15 days and a 10 to 15% rate of fatality.
- Most contaminations are due to the inhalation of micro particles of water coming mostly from cooling towers and sanitary hot water. People with a weaker immune system are more prone to developing the disease.
- Largely ignored until the early 90s, legionnaire outbreaks have increased tremendously since 1996. It can be now detected through a urine test.



Legionella treatment

There are only few viable treatments available:

- Thermo shock (energy wasting and dangerous for users)
- UV treatment (only topical and does not treat biofilms and ducts)
- Chlorine shock (temporary and makes water unusable)
- Ionization (ideal, high residual effect, harmless to people and environmentally friendly)

Waterborne pathogens control

- Most pathogens can be controlled by adding chemicals to the water; a costly, non environmental method.
- Chlorine, a sterilizer used in swimming pool, releases Chloramine gases that are harmful to humans and responsible for asthma (20% of competitive swimmers are plagued with asthma).
- Boiling water is sometimes used, but not regarded as a viable solution, because of the high power consumption.
- Addition of chemicals makes water unsuitable for human intake.

Waterborne pathogens control

- Today, all these pathogens can be efficiently eradicated by copper/silver ionization, a cheap, chemicals free and environmentally friendly technique. Ionization efficiently eradicates Legionella Pneumophila, pseudomonas, coli forms, streptococci, staphylococci, as well as algae.
- Additionally, ionic treatments have an active persistence in water system for several weeks.



Fields of application

Ionization is currently used on:

- Water storage and supply lines.
- Water cooling towers.
- Hot water systems.
- Swimming pools and hot springs

Ideally, new residential or commercial buildings should be equipped with a central system that sanitizes the entire water supply.

Sofchem

Technological edge & products range





Ionic Products & Services

- Sofchem: Simple, easy to install and economical, Sofchem products can be adapted to any volume and water applications. It utilizes electrodes made of a combination of copper and silver.
- Sofchem water treatment technologies are specifically engineered and manufactured to ensure your water facilities comply with current water treatment requirements and international health standards. (Copper levels are controlled circa 0,5ppm and silver levels to 0,05ppm).

References

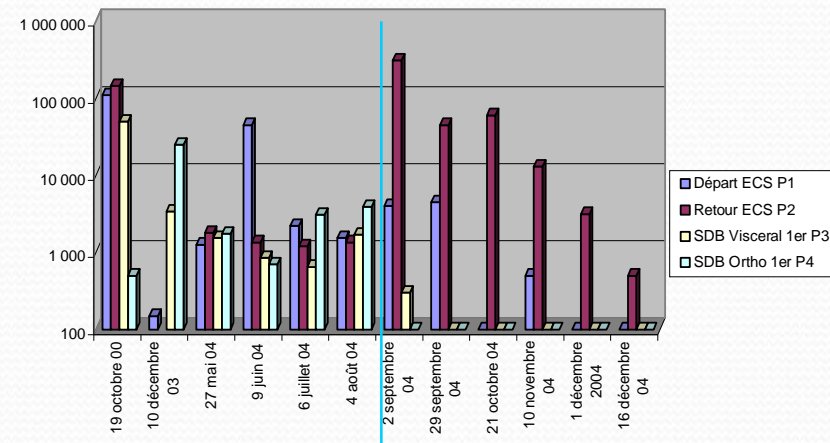
- Sofchem has been providing ionic systems throughout Europe, Canada, North Africa and the Middle East for 17 years. Sofchem systems are installed, and are still operating efficiently on many hot water systems, water cooling towers and water storage in hospitals, schools/colleges and hotels worldwide, on many swimming pools, as well as on the Monaco World Trade Center, and water parks in Canada.
- ***Sofchem products are recommended by the EWGLI (“European Working Group on Legionella Infections”).***

Testing

Eleven Enterprises (hospitals, colleges..) have been tested with the Sofchem systems over a 6 to 24 months period.

Before treatment, Legionella levels were in the range 10^3 et 10^6 UFC/lit. After 6 months treatment, all water systems were safe (< 250 UFC/lit)

Right: Typical test results chart on one of water treatment for Legionella



References:

1. Yu VL, Stout JE. Experiences of the first 16 hospitals using Copper-silver ionisation for *Legionella* control. *Infection Control and Hospital Epidemiology* 2003 ;24,8 :563-568
2. Circulaire DGS 2002/243 du 22 avril 2002, Décret 2001/1220 du 20 décembre 2001
3. Avis AFSSA 21 janvier 2003, Courrier DGS 3 février 2004
4. IRH, Bacter, LRBM, L.A.B, Alphée, Bouisson Bertrand...

(Testimonials and References available on request.)

Sofchem

Scope & Applications





Sofchem scope of applications

Whether you are a local council, healthcare trust, luxury hotel or leisure facility Sofchem has the solution for your business. From industrial to luxury, we offer both basic and bespoke water treatment systems tailor-made to your specific requirements.



Residential, hotel & office buildings

- Hotel operators and building managers will enjoy peace of mind. Our ionic system will eradicate the risks for spread water/airborne pathogens. It will also lower operating costs on chemicals, and give your company an edge in marketing.
- Ionic water is used on supply lines, on cooling towers, in pools, and can also be distributed to water fountains and other water features.



Industrial and foodstuff

- High levels of chlorine and other chemicals are no longer acceptable in the use of food preparation. Wherever water is used in the manufacture of food products, or for cleaning foodstuff (food factories, farms) our system will ensure all bacteria is killed. When used as stand-alone on water supply lines, it will also prove much cheaper than other systems such as reverse osmosis.
- Sofchem technology can also be used in manufacturing plants to treat recycled, processed water instead of using expensive materials that can be damaging to the environment.



Health care / Hospitals

- Installed on hospitals lines, ionic systems are the best solution to control the spread of diseases.
 - 75 Hospitals in the USA have been equipped and tested with ionic systems over an 11-years period.
 - 11 Hospitals and public facilities have equipped and tested successfully with Sofchem ionic systems, and all approved by the French Dept of Health.



Leisure

- In Spas, hot springs and hydrotherapy centers, germs multiply very fast due to the heat.
- Ionic water, coupled to a PH regulating device, will control the development of bacteria and ensure that the hot water is clean, germ free and healthy.

Swimming Pools

- Today's health conscious swimmers and pools operators want to reduce the levels of chemicals in the pools.
- Chlorine is known to be dangerous for the respiratory tracts and lungs. Chloramine gases corrode pool equipment, and induce asthma (20% of competitive swimmers are diagnosed with asthma).
- Chloramines also need large air recycling, heating or air conditioning that are a waste of energy
- Ionization will reduce the chlorine use to drinking water levels and produce crystal clear water that is non irritant to the skin and eyes.

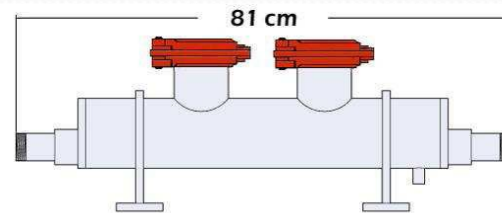
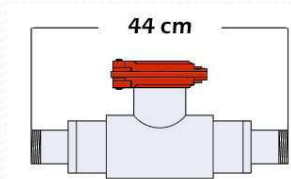
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Typical Installations

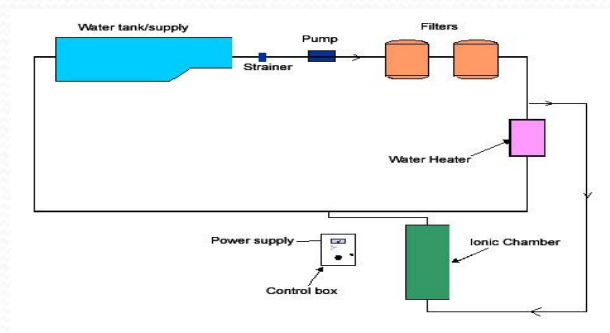


Sofchem LPQ Systems

Cells can be used singly or coupled up to 12 pairs of electrodes.
High temperature chambers are covered with fiberglass
And can stand a temperature of $\pm 80^{\circ}\text{C}$ and a pressure of 6 bars



Typical installation - Control box and Copper/Silver Anodes



UV System

- On some applications, UV sterilization can be provided . Typical installation includes a control box, and UV chambers
- Systems can stand a pressure of 10 bars and high volume flow.



Ionic Water Advantages

- Easy to handle
- Easy to maintain
- Reduced/eliminated chemicals
- Healthy & User friendly
- Environment friendly
- Low power consumption
- Low running costs



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