



***Complex  
Water Systems***



Clean Water for the 21st Century

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*“Clean water is essential for life. Research now confirms that disinfection by-products, resulting from conventional chemical water treatments, are harmful to our health and our environment. Further, these disinfection methods are unable to cope with the contamination challenge of biofilm formation within complex drinking water distribution systems. Legionella Pneumophila and other bacteria often thrive in multi-occupancy buildings and are a major source of weakness in the building’s bio-security and drinking water quality.”*

A tested and proved ecological and health sustaining alternative is now available with Huwa-San™ Stabilized Peroxide. Since 2004, this food grade peroxide ensures clean drinking water in complex water systems in Europe but without cancer-causing disinfection by-products. As of 2010, it has also obtained National Sanitation Foundation (NSF) approval (STD 60) with allowed residual peroxide at the tap. At 8 mg/L, it will ensure clean water at all outlets.

## What is Huwa-San™ Peroxide Technology?

Huwa-San™ Peroxide's only active ingredient is ultra pure, or "food grade" peroxide, stabilized around a minute amount of soluble silver. This allows the peroxide to break down slowly and react more strongly, making it exponentially more effective. Once the peroxide is used to oxidize microbes or other harmful chemicals, it breaks down into water and oxygen, making it health and life sustaining.

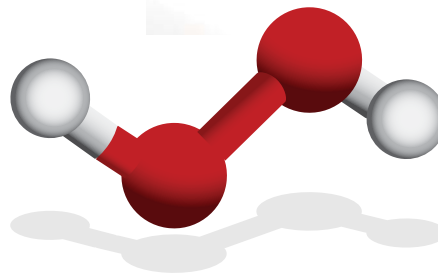
## The Health Benefits of Hydrogen Peroxide

Hydrogen Peroxide is a natural substance produced by the body. The ability of human cells to produce hydrogen peroxide is essential for life.  $H_2O_2$  is not an undesirable by-product or toxin. It is, instead, a basic requirement for good health.

Newer research indicates that humans use hydrogen peroxide for a multitude of chemical reactions taking place in the body. For example, it is now known that Vitamin C helps fight infections by producing hydrogen peroxide. Lactobacillus, found in the colon, produces hydrogen peroxide, combating harmful bacteria and viruses, preventing colon disease, bladder infections and a host of other common ailments.

Hydrogen peroxide is one of the many components that help regulate the amount of oxygen getting into cells. Its presence is known to be vital for many other functions, like the production of thyroid and sexual hormones, the dilation of blood vessels in the heart and brain and the improvement of glucose utilization in diabetics.

**Hydrogen peroxide**  
**( $H_2O_2$ )**

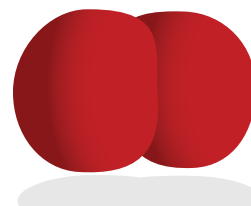


**B R E A K S   D O W N   I N T O**



**Water** &  
**( $H_2O$ )**

**Oxygen**  
**( $O_2$ )**



## Complex Water Systems Comparison Chart

	Copper-Silver Ionization	Thermal Eradication	Chlorination
Efficacy	<ul style="list-style-type: none"> <li>- Residual disinfection</li> <li>- No treatment of cold water</li> <li>- pH sensitive (6-7.6)</li> </ul>	<ul style="list-style-type: none"> <li>- No consistent results with biofilm</li> <li>- Not effective when unable to heat water for 30 min</li> <li>- Not effective in cold water system</li> </ul>	<ul style="list-style-type: none"> <li>- Provides residual disinfection</li> <li>- Very poor biofilm control properties</li> </ul>
Environmental Friendliness	Copper is acutely toxic to many aquatic species at levels as low as 50 ppb	Large waste of water	Dioxin is formed in production process causing various diseases (sterility, cancer...)
Health	<ul style="list-style-type: none"> <li>- Relatively high levels of copper &amp; silver ingestion</li> <li>- No by-products</li> </ul>	No DBP's (Disinfection By-products)*	Creates DBP's that cause cancer
Legionella	<ul style="list-style-type: none"> <li>- Keeps Legionella at lower levels</li> <li>- Does not completely eradicate Legionella</li> </ul>	Legionella will eventually recolonize the system	Does not eradicate Legionella on inner surfaces in piping system
Cost	<ul style="list-style-type: none"> <li>- High capital cost</li> <li>- High cost for residual monitoring</li> </ul>	High wasted energy cost	Medium; plumbing damage and health and environmental costs not accounted for
Impact on Equipment & Systems	High silver levels can cause staining	Potential damage of water system	Induces corrosion in the piping, damaging the plumbing system
User-friendliness	Complicated installation and difficult to control (pH)	<ul style="list-style-type: none"> <li>- No special equipment</li> <li>- Time-consuming &amp; labour-intensive</li> <li>- Risk of scalding</li> </ul>	<ul style="list-style-type: none"> <li>- Stringent monitoring of chlorine levels</li> <li>- Toxic odours and vapours</li> <li>- Requires specialist handling</li> </ul>
Comments		Non-permanent solution; only used if Legionella is already present	Distinct chlorine odour & taste



Instantaneous Steam Heating	Ultraviolet Irradiation	Chlorine Dioxide	Huwa-San Peroxide
<ul style="list-style-type: none"> <li>- Effective when installed in the original heating system</li> <li>- No protection of cold water system</li> </ul>	<ul style="list-style-type: none"> <li>- No residual disinfection</li> <li>- Decreased efficacy with high water temperature and scale</li> <li>- Biofilm can shelter micro-organisms from disinfection light</li> </ul>	<ul style="list-style-type: none"> <li>- Residual disinfection</li> <li>- Works slowly as a biofilm penetrant</li> <li>- Rapidly comes out of the hot water, increasing contamination risks</li> </ul>	<ul style="list-style-type: none"> <li>- Effective at removing &amp; controlling biofilm</li> <li>- Long term effectiveness in wide range of temperatures &amp; pH</li> </ul>
Good; no large waste of water	Very good	Toxic chemical load in the environment	Excellent; decomposes into water & oxygen
No DBP's	No DBP's	Creates DBP's that cause cancer	Breaks down chemicals that create DBP's
Legionella will eventually recolonize the system	Does not eliminate Legionella colonization	Some Legionella control	Complete Legionella control in drinking water as evidenced by stringent sampling
<ul style="list-style-type: none"> <li>- Costly initial capital outlay</li> <li>- More cost-efficient than thermal eradication since hot water is not stored</li> </ul>	High; annual costly replacement of lamps	Expensive equipment	<ul style="list-style-type: none"> <li>- Low capital cost; simple injection system</li> <li>- Energy savings by reducing water temp. in water heaters</li> </ul>
Potential damage of water system	Does not damage the plumbing system	Low concentrations minimize corrosion concerns	Does not damage the plumbing system
<ul style="list-style-type: none"> <li>- No need for hot water tanks</li> <li>- Difficult to fit into old buildings</li> </ul>	<ul style="list-style-type: none"> <li>- Good; regular maintenance is required</li> <li>- Efficiency questionable if lens shows biofilm build-up</li> </ul>	<ul style="list-style-type: none"> <li>- Separate dosing for hot &amp; cold water</li> <li>- Multiple units for large facilities</li> </ul>	<ul style="list-style-type: none"> <li>- Easy switching between emergency &amp; continuous dosing</li> <li>- Simple residual monitoring</li> </ul>
Cannot be used as sole disinfection if already infected with Legionella		Deleterious on labs, dialysis & neonates	<ul style="list-style-type: none"> <li>- Constant protection with continuous dosing</li> <li>- Dialysis and laboratory water needs carbon filter</li> </ul>



## Treatment Steps to Clean Water

- A Huwa-San™ Peroxide dosing system provides the optimal solution to ensure clean water and improved bio-security in a complex water system. It is low maintenance, cost-effective and treats well water and municipally chlorinated water.
- A Huwa-San™ peroxide system is relatively easy and cost-effective to install. The main equipment consists of two peroxide dosing pumps (one as back-up), a flow meter and a tank filled with Huwa-San Peroxide. When the water runs, the dosing pump will simultaneously inject the correct concentration of Huwa-San Peroxide into the water flow. We have much experience with customized on-line monitoring and automated dosing systems ensuring complete security for your water system.
- The treatment steps to bio-security in a complex water system are:

### 1. Remediation

Biofilm contamination grows on the inner surfaces of virtually all piping systems and is nearly impossible to eradicate with conventional chemicals. Clean-out of the whole system with a higher dosage is the best option to clean all outlets. On average, a dwell time of 4-6 hours, followed by flushing, will remove the contamination from the water distribution system. Recontamination occurs in 4-6 weeks, depending on raw water quality. Where prolonged clean-out is not an option, the system can be run at a 100ppm dose for several hours where water can be used for all functions except drinking until the procedure is complete and the peroxide residual brought down to normal levels.

### 2. Continuous Dosing

After clean-out of the pipe network, keeping the water clean on a constant basis is recommended to prevent new contamination from entering and growing in the water through the pipe network. Continual protection is ensured with a minute residual, 5-8 parts per million or mg/L of Hydrogen Peroxide.

## Legionella in Domestic Water Systems

Legionella Pneumophila is a bacterium present in water and can cause pneumonia and other illnesses. Although it is easily killed by disinfectants when it is free floating in water, it tends to hide in biofilm where disinfectants don't reach it. Biofilm is what grows on the internal surfaces of piping in almost every water system. Traditional water treatment chemicals are generally ineffective in combating biofilm. In Canada, Legionella is supposed to be controlled by maintaining the hot water system at or above 60°C. This, however, is not an ideal solution as it is very costly, is not suitable for older buildings and it fails to protect the cold water system. Legionella can also very quickly recolonize after a super chlorination treatment (6 to 10 days).

A study from the US shows that at least 70% of hospitals are infected with Legionella bacteria. Many patients who develop Bacterial Pneumonia are not necessarily tested for Legionella Pneumophila. An estimated 1400 deaths occur each year in the United States as a result of waterborne hospital-acquired pneumonia. Hospitals carry the greater risk for Legionellosis, but this does not reduce the need for Legionella and bacteriological control in other multi-occupancy buildings, such as hotels, residential care homes, condos and apartments.

### Treatment with Huwa-San Peroxide

Huwa-San peroxide is effective in killing planktonic Legionella and is able to remove biofilm contamination and prevent recontamination of the water supply. In multiple five star hotels and public health hospitals in Europe it has been shown to permanently prevent recontamination by continuous dosing at very low concentrations since 2004.

*References are available by request.*

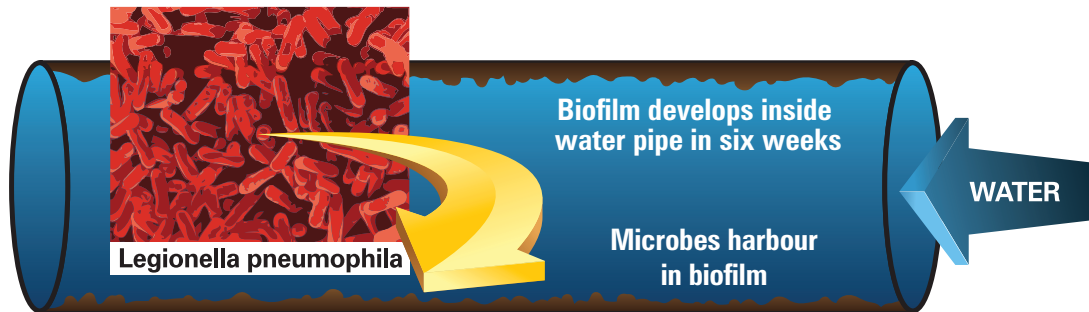


**Huwa-San Peroxide Dosing system  
at NHS Hospital in the UK.**



## Clean Water and Biofilm Contamination

What happens inside a water pipe?



A dirty pipe puts your drinking water quality at risk of contamination

## Disinfection By-Products

When chlorine reacts with natural organic matter in the source water, disinfection by-products (DBP's) are formed. Over the last 10 years, a growing body of research has confirmed that DBP's are among the worst toxins found in tap and bottled water. Exposure is not just through drinking but also via cooking and showering.

A review of DBP health effects found that nearly thirty peer-reviewed epidemiologic studies linked these by-products to increased risks of cancer, including many cases of bladder cancer. DBP exposure may also be associated with miscarriages or low birth weight, a public health risk under current investigation. Additional health problems from DBP exposure may include rectal and colon cancers, kidney and spleen disorders, immune system problems and neurotoxic effects.

Two primary DBP categories are trihalomethanes (THM's) and haloacetic acids (HAA's). These DBPs have been linked to damaging effects to heart, lung, kidney and central nervous system as well as an increased risk of cancer. HAA's are genotoxic and carcinogenic and can produce significant metabolic disturbances. Other derivatives, such as chloramines and chlorine dioxide were found to have other DBP's, not so well known, but potentially even more harmful.

THM's have been shown to cause cancer in laboratory animals, and are therefore classified as Cancer Group B carcinogens.

The legal limit of THM's in drinking water in Canada and the USA is between 80-100 ppb, which represents a compromise between public health and increased water treatment costs needed for lowering THM levels in municipal water. This limit still equates to bladder cancer cases nationwide from people ingesting THM's in drinking water. Various THM's are also detected in several brands of bottled water, at values two to three times greater than the bottled water industry's voluntary standard of 10 ppb.

## Take charge of your drinking water today:

The Huwa-San Peroxide Water System provides clean drinking water, without compromising our health or the environment. This food grade, NSF-certified peroxide is cost-effective, affordable and ensures protection from waterborne bacteria and viruses in a complex water system, while providing oxygen-rich water without disinfection by-products. Huwa-San Peroxide is compatible with existing water conditioners and filters, extending their life-span and efficiency.

This unique technology is now available in Canada.

Don't take any risks with your complex water system.

Contact us now for more information at [info@sanecotec.com](mailto:info@sanecotec.com)

or

CALL 1-877-610-0787

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Huwa-San Technology is approved for Drinking Water Standard 60 by NSF and certified by Ecocert Canada.

