ELGRESSY
ENGINEERING SERVICES LTD.

Chemical Free Water Treatment

About Us

In 1977, Elgressy Engineering was established with a target of developing cost-efficient and 100% green electrochemical systems for treating water and wastewater.

Today, Elgressy is an industry leader in chemical-free water treatment with over 3,000 installations world-wide.

With patented and innovative electrochemistry technology at its core, Elgressy developed groundbreaking, chemical-free water treatment solutions for industrial, commercial and municipal applications.

Elgressy' industrial-grade electrochemical systems revolutionize water and wastewater treatment by providing simple, reliable and cost-effective systems and knowhow.

Elgressy systems are designed for long life and simple serviceability, always keeping the operator and maintenance technician in mind.

Elgressy maintains lasting relationships with its customers by keeping their water treatment applications problem free and providing engineering, technical and training support.

Applications:

- Cooling Towers
- Corrosion Prevention for Cold and Hot Water System
- Disinfection of Legionella and Bio-Fouling
- Contaminant Removal

Cooling Towers Treatment - EST

EST is revolutionizing cooling tower treatment by providing a comprehensive and effective chemical free solution to scaling, corrosion and biofouling.

Typically, hazardous chemicals are added to the cooling water to inhibit corrosion of system components, to retard mineral scaling, and to limit bacteria growth.

How does it work?

The EST system connects to the cooling tower basin and circulates water therein. A controlled constant DC current is applied to the patented, titanium nickel oxide anodes, generating the following effects:

Disinfection:

1. An alkaline environment of pH 13 is created next to the reaction tank's inner walls creating a strong disinfectant.

2. Near the anodes, 3-7% of the naturally present chlorides are converted to free chlorine or hypochlorite (OCl-). The OCl- level is programmable to automatically remain at ~0.1-0.2ppm, providing additional disinfection without the risk of corrosion.

3. Additionally, disinfecting radical oxygen, ozone and hydrogen peroxide are produced near the anode.

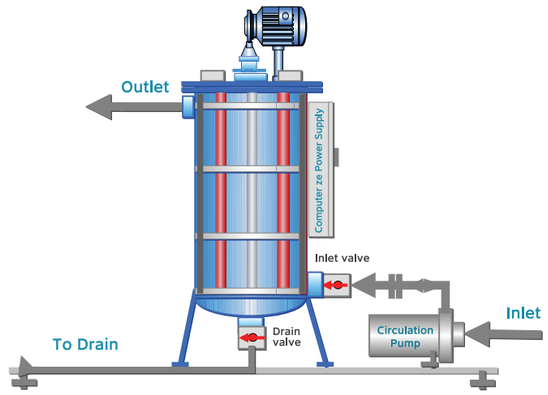
Scale removal:

The electrical current causes a dissociation of the salts in the water into ions, precipitating the calcium (and other cations) on the reaction tank wall. The EST is capable of precipitating > 30% calcium from the water before it crystallizes into scale, while the remaining calcium is kept dissolved in the water. The calcium precipitation percentage is programmable, automated and varies from project to project.

The EST patented scraper system automatically scrapes and flushes the reaction tank to remove the precipitated scale.

Corrosion control:

The remaining mineral levels in the water are adjusted to enable corrosion free operation

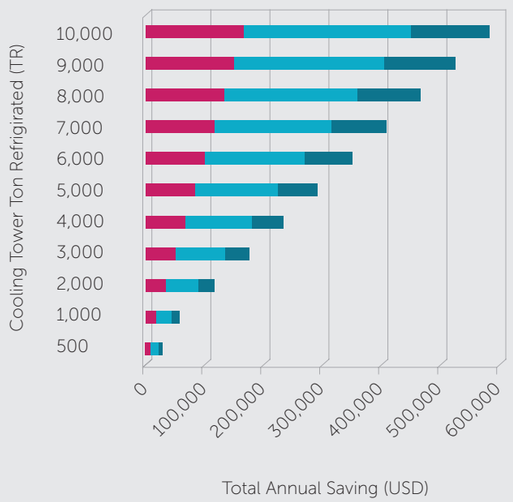


EST

Advantages:

- Chemical free solution –eliminates the need for expensive and harmful chemical dosing
- Huge water savings
- Very low life cycle cost and electricity consumption
- Solves operational problems stemming from algae, corrosion and scaling
- Reduces maintenance, shut down time and labor cost
- Exceptionally cost effective offering a rapid return of investment
- Controllable and measurable ensuring consistent quality water
- Small footprint
- Robust and high-quality equipment with few moving parts
- Modular and simple to install or retrofit
- Proven effective in thousands of installations worldwide.
- Enormously environmentally friendly

Cooling Tower Annual Saving Calculation

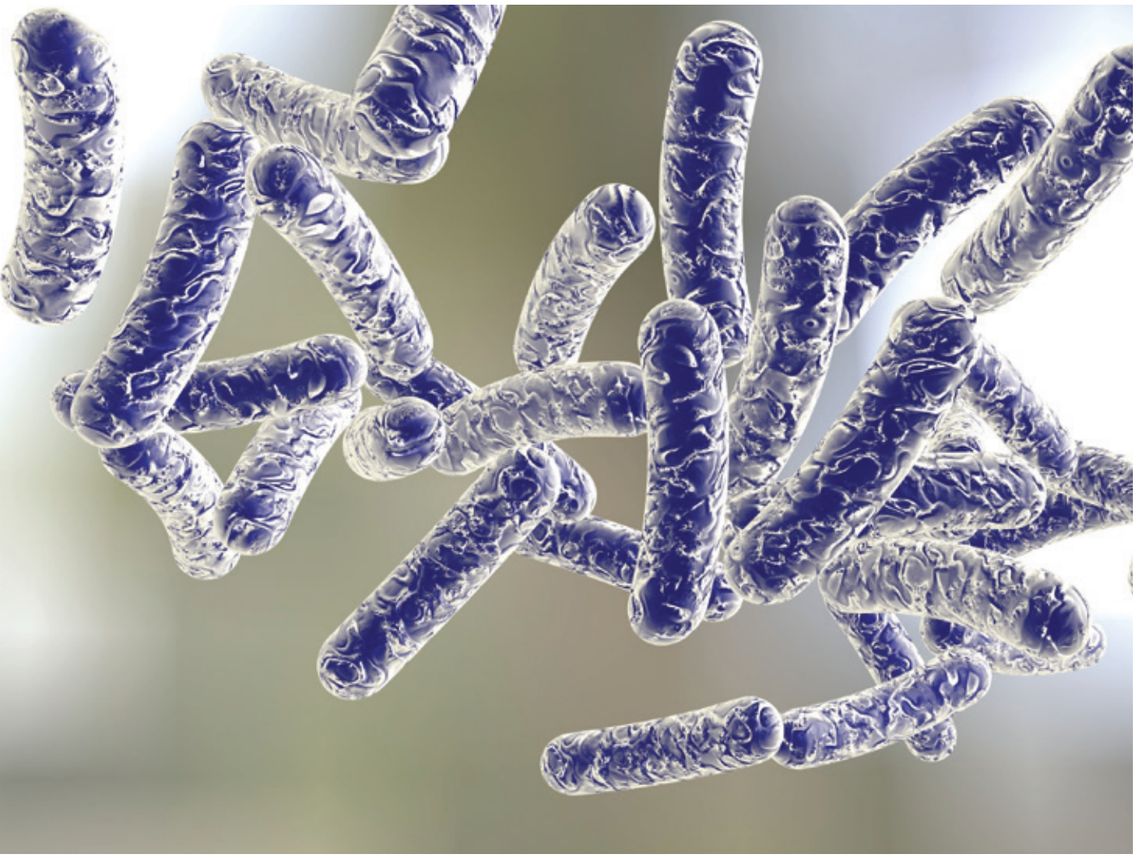


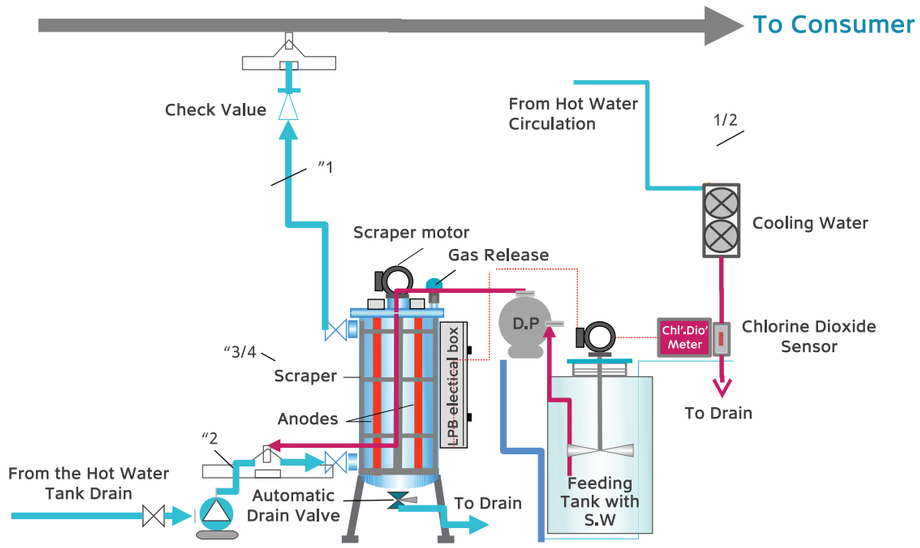
- Annual saving - Water (USD)
- Annual saving - reuse of water for irrigation (USD)
- Annual savings - chemicals (USD)

Basic assumptions:
Savings calculation is based on actual case stusies done by Elgressy Engineering Ltd.
Chemicals cost: 0.3$/m (make up water)
Water cost = 1.5$/m (including sewage disposal costs)
Tower operation: 2,000 hrs/yr.

Disinfection of Legionella Pneumophila and resilient bacteria - LPB

Elgressy' patented LPB system, approved by the Spanish, and Israel Ministries of Health, facilitates the automatic control and eradication of micro-organisms, including Legionella Pneumophila bacteria, in hot and cold-water systems.





About Legionella Pneumophila:

Legionella bacteria were first isolated and identified in 1976, following an American Legion convention in Philadelphia, where 221 participants contacted severe pneumonia, of whom 34 died. The isolated bacteria were thus named Legionella in their memory.

Legionella bacteria are found in every possible water source, with the best conditions for growth being present in how water systems. The bacteria thrive in water temperatures of 20°C to 55°C, though they can also survive temperatures near the range limits.

The bacteria live and multiply in air conditioning systems (the source of infection at the American Legion convention), hot water systems, cooling towers and more.

Often fatal, the elderly, young, and people with damaged immune systems, are particularly susceptible.

Conventional chemical treatment:

Traditional treatment against Legionella, is based chlorine dioxide dosing.

Chemical dosing, however, has its deficiencies:

1. It's expensive
2. It causes corrosion
3. It's dangerous - special storage and supervision conditions are required
4. Maintenance is frequent and continuous
5. Its polluting

LPB- effective, economical and safe

The LPB system operates using a reaction tank containing patented titanium and nickel oxide anodes. A direct electric current is passed through the anodes generating a controlled amount of chlorine dioxide.

Digital ClO2 meters continuously monitor the chlorine dioxide levels of the water exiting (0.8ppm) and entering (>0.2ppm) the reaction tank. The current automatically adjusts to meet predetermined programmed ClO2 levels, ensuring uninterrupted and effective treatment.

In addition to the electrochemical disinfection process, the LPB systems precipitate some of the scale in the water, thereby diminishing the bacteria natural breeding ground. Furthermore, turbulence is triggered at the water entry point, thus preventing sediment and scale buildup at the bottom of the water tank and additionally depriving the bacteria of their growth medium.

As an added safeguard, the LPB treated water are pumped through heat exchangers where temperatures exceeding 70°C eradicate any remaining bacteria.

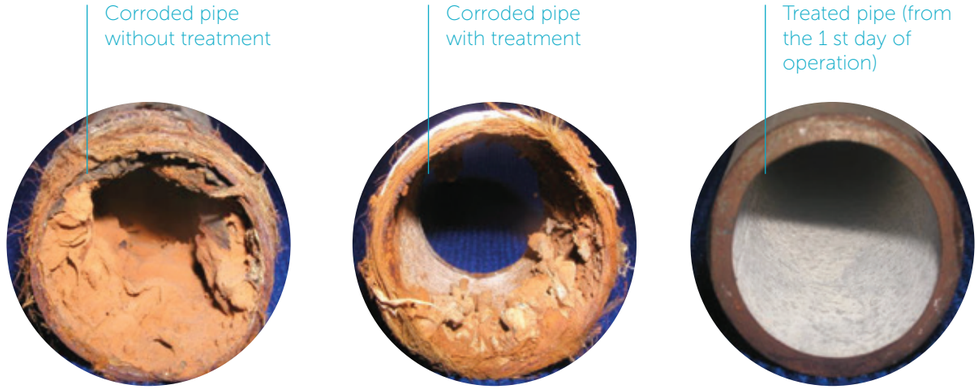
A circulation pump circulates the water between the reaction tank and the water system.

Advantages:

- Patented and innovative treatment which tackles both the bacteria itself and its breeding ground.
- Chemical free, safe and ecological.
- Reliable for uninterrupted disinfection.
- Cost effective
- Does not cause corrosion.
- Low operational and maintenance requirements.
- Long equipment lifetime.

Corrosion prevention - ECP

ECP is an effective and innovative electrolysis technology developed to protect the inner surfaces of water pipes and tanks against corrosion and scale.



The ECP is applicable for:

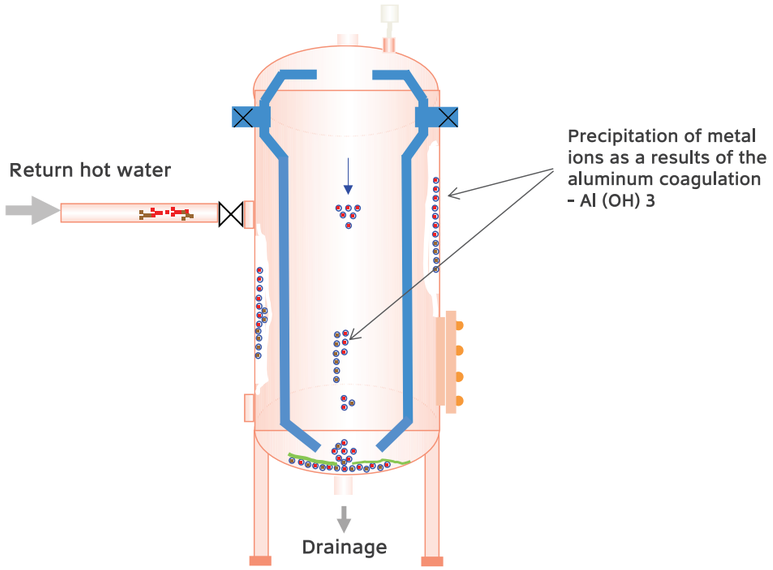
- Hot and cold-water systems
- Corroded and new pipes
- Copper, galvanized and combination pipe composition
- Pipes, water heaters, tanks and boilers

Corrosion and associated scale cause major problems:

- Increased maintenance and shut down costs
- Reduced system life expectancy.
- "Red" or contaminated water that is unsuitable for human use or reuse.
- Increased scale deposits which inhibit water flow and increase energy consumption.

How does it work:

- A combination of a constant direct current and a sacrificial aluminum electrode, release trace quantities of aluminum compounds into the water.
- The aluminum compounds are not easily soluble and form a homogeneous, 0.3mm thick protective layer on all internal surfaces.
- Oxygen is a contributing factor to corrosion in plastic pipes and its levels are reduced in the process.
- Specialized passages in the ECP facilitate resistance to high pressure and temperatures, even in water temperatures exceeding 60o C, when polarity reversal occurs causing corrosion by galvanization.
- This Al layer protects the system from the effects of new corrosion, prevents the spread of existing corrosion and prevents scale build-up.



Advantages:

- Rapid results - Immediate prevention of new corrosion accumulation and stoppage of "red water".
- Versatile Operation - The system can be installed in hot and cold-water systems and is effective in water tanks and all the pipes leading in and out of the system whether galvanized, plastic or copper.
- Prevention and Correction - The ECP both prevents future corrosion and works to cure the effects of corrosion already present in the system
- Simple retrofit installation – external connection to the water system, requiring no complicated installation procedures or alterations to the existing system.
- Environmentally friendly - free of harmful chemicals and harmless to the environment and humans.
- Safe drinking water - no adverse effect on drinking water quality or taste.
- Low operational cost - low energy use and low water consumption rates.
- Cost effective - prevents pipe and water tank damage as well as pipe blockages.
- Automated - The system is fully automatic and provides continuous control over water quality.

Contaminants Removal – EEC/EEO

Elgressy electrocoagulation and oxidation systems efficiently separate and remove contaminants from water, without using chemical additives or generating hazardous byproducts.

Experience the Elgressy difference:

Elgressy EEC and EEO systems are integrated, custom-designed, electrocoagulation and electro-oxidation systems backed by vast industry knowledge, application expertise and a commitment to customer service since the 1977.

Revolutionizing water treatment:

EEC/EEO utilize proprietary electrodes and components to substantially remove multiple impurities from water, wastewater and rivers. These include various heavy metals, metalloids, silica, organics, ammonia, nitrates, nitrites, phosphates, emulsified oils, suspended solids, solid particles, dye, arsenic, radioactive isotopes and even pathogens.

Innovative technology designed to meet your needs

Elgressy custom manufacture the EEC/EEO systems according to the varying concentrations of contaminants and the clients desired result. Factors such as current density, pH, electrode type, reaction time, etc. are key factors in determining the system size, shape, metals, surface area and configuration.

Elgressy proprietary electrodes are manufactured to target a specific or broad range of contaminants in water and offer a high surface area to volume ratio. As a result, ionization efficiency of the electrode is superior, making the electrocoagulation process effective, energy efficient and quick.

The EEC/O systems allow for immediate treatment without chemicals, significantly improve operations, reduce overall treatment costs, and help meet increasing environmental regulations.

Advantages:

- Proprietary electrodes and components
- "industrial grade" - minimal attention and service required.
- Chemical free - no hazardous byproducts are generated during the process and no chemical additives are required.
- Low Capital Cost – EEC/O systems generate substantial savings over current operations.
- Low Operating Cost - Operating costs can be dramatically reduced by smoother operations and elimination of reagent chemicals and polymer consumption.
- Simple to retrofit
- Large electrode surface area enables improved reactions
- Effective for a broad range of impurities with the ability to target specific contaminants
- Scalable - 1m3/h – 100m3/h
- Minimal electrode material and energy consumption
- Simple electrode replacement
- Peace of Mind - Comply with current and future regulations.
- Reduced Salts in Effluent-Low or no use of reagents reduces the sodium, sulfates and chlorides in the effluent
- Lower Sludge Quantities – significantly less sludge is produced resulting in lower disposal costs.

Sample removal rates of key constituents

	Constituent	Average reduction
Organics	Oil and Grease BTEX	81.2 - 99.3%
	BTEX	35.2 - 99.9%
	Biochemical Oxygen Demand (BOD)	37.2 - 83.6%
Metals	Barium	42.1 - 81.1%
	Cadmium	50.6 - 99.1%
	Calcium	31.3 – 84.1%
	Chromium, Hexavalent	72.5 - 99.9%
	Chromium, Total	70.8 - 99.9% 70. - 99.9%
	Copper	81.5 - 99.9% 81.5 - 99.9%
	Iron	78.1 - 99.9%
	Lead	80.4 - 99.9%
	Nickel	72.5 - 99.9% 72.5 - 99.9%
	Silver	59.6 - 99.8% 59.6 - 99.8%
	Molybdenum	31.1 - 98.5%
	Aluminum	75.3 - 99.9%
	Cobalt	70.8 - 99.9%
	Gold	54.8 - 87.2%
	Phosphorus	72.1 - 99.9%
	Zinc	81.6 - 99.9%
	Silica	45 - 98.6%
	Tin	68.2 - 98.5%
	Manganese	24.4 - 99.8%
Inorganic Anions	Ammonia	37.8 - 97.3%
	Cyanide	71.3 - 81.1%
	Sulfide	72.0 - 95.4%
Microbiological & Misc.	Acid Producing Bacteria	72.3 - 99.4%
	Heterotrophic Plate Count	81.1 - 99.8%
	Sulfate Reducing Bacteria	91.1 - 99.9%
	Total Suspended Solids	42.3 - 99.8%

Clean, Efficient, Ecological:

Elgressy meets the challenge of advancing human and economic growth while minimizing their adverse effects, by eliminating the need for chemicals and facilitating significant fresh-water savings.

As the world population approaches eight billion, consumption and production levels are increasingly extending beyond the limits of our planet capacity.

Chemical pollution

Chemicals have enabled productivity and quality of life throughout the world and are integral to our everyday life.

The current global annual chemical production stands at 2.3 billion tons and is projected to double by 2030, according the UN.

Driven by economic development, population dynamics and other global megatrends, the chemicals market across a range of industry sectors is expanding.

Though regulations have been implemented, experience teaches us that what we once thought was safe, often turns out to have effects that manifest themselves in the long run.

Fresh Water Scarcity

Fresh water is one of the worlds' scarcest resources.

Only 2.5% of the earth's water is fresh water, of which 70% is frozen in icecaps. Most of the remaining fresh water is too deep underground to access; leaving only 1% of the earth's fresh water available for human consumption.

It's estimated that 23% of all fresh water spent is utilized for industry, of which a staggering 70% is spent on utilities.

Why Elgressy?

Because...

We listen to you and respond to your specific needs by providing innovative and effective water treatment solutions with short lead times, high degree of flexibility, and great value for money.

We generate immense savings by eliminating chemical consumption, decreasing water expenditure and lowering maintenance costs thereby facilitating a rapid return of investment

We've been around since 1977, installed over 2,000 systems globally and specialize in solving water related operational problems

Our systems are modular, simple to install or retrofit, and built to last

We're exceptionally environmentally friendly

Among Our Clients:

intel
posco
TEVA
TOYOTA
Mercedes-Benz
HONDA
VOLVO
Coca-Cola
Unilever
SHERATON
Hilton
Club Med
TATA sky
Tetra Pak
भारतीय विमानपत्तन प्राधिकरण
Airports Authority of India
एयर इंडिया
AIR INDIA
DELHI METRO
San Miguel
Mahou
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