ElectroLIFE FOR SCALE REMOVAL AND ENERGY SAVINGS

Frequently Asked Questions and Answers

In order to better understand the key components of the ElectroLife process, the following questions and answers are provided.

Question: Why does the ElectroLife deliver such an effective scale removing ability?

Answer: The ElectroLife process utilizes a very strong electrical current through its advanced electrolysis process. When compared to a lower level of electricity that is applied, through both the magnetic and electromagnetic methods, the ElectroLife delivers a significantly higher level of electrical current. Although the level of the electrical current depends on the size of the magnetic device, it is in the realm of 1mA (milli Amp).

As for the case of the low level AC (alternating current) electrolysis method is concerned, similar to the magnetic and electromagnetic levels of current, with a lower level of 100mA, the overall effect in descaling is limited. With the ElectroLife process introducing 10A or 10,000 mA of current, the higher level of efficacy is attained.

When comparing the ElectroLife process to that of magnetics or electromagnetics, it has nearly 50 times the solubility and when comparing it to the weaker form of AC electrolysis, it has nearly 5 times the solubility. (Please keep in mind that the sizing of each of these apparatuses will produce different results.)

The objective of descaling is to introduce a right level of solubility into the circulation water which in turn expedites the descaling process.

Therefore, the heightened level of electrical current that is introduced through the ElectroLife method produces a highly effective level of solubility resulting in a high level of descaling to occur.

Question: If the ElectroLife process is running 10A of electrical current, will the electric bill be high?

Answer: Although a current flow of 10A is present, it is normally operated at a level of 20V so the power consumption of 200W is considered nominal.

Question: **If the ElectroLife process is running 10A of electrical current, is this amount of current safe to operate?**

Answer: Due to this low voltage, the process is safe to operate.

Question: **What are the primary characteristics of the ElectroLife unit and process that makes it better suitable to cooling tower maintenance?**

Answer:

1. In order to understand the basis of the ElectroLife process, it is important to understand the key factor on what occurs during electrolysis.

   When water is exposed to electrolysis, and the water has an abundance of minerals in it, as the electrical current is applied to the electrodes in the electrolysis chamber, these minerals which form the scaling are attracted to one electrode, referred to as the cathode.

   If we were to talk about calcium and calcium was a mineral with a positive charge, then the electrical current applied to the negative electrode, will attract this positively-charged calcium towards itself.

   During this electrode-originated attraction, the calcium that is primarily forming the scaling, will be 'split' away and freely floating in the circulatory water.

2. Now that the calcium has been 'split' away and freely floating in the circulatory water, it is important that the ElectroLife process, intermittently direct this calcium through a drain mode to discard this scaling in a systematic manner.

   The ElectroLife process has now effectively 'split' the calcium to a free-floating state and has also discarded the calcium/scaling through its pre-scheduled and intermittent 'drain' mode.

3. Unlike the AC, low current electrolysis process, the DC method of a higher level of electrolysis intensity, instills a higher level of energy into the water, so that an overall-and-successful process of descaling is consistently applied to the circulatory water.

   Through this method, the material that is utilized in the composition of the electrode ensures the non-degradation of electrodes despite the use of a strong electrical current.

4. In conjunction with the electrical charge that is provided to the electrodes, that are the main components within the electrolysis chamber, a feature that is designed into the ElectroLife unit ensures that 'pre-scheduled reversals of electrical polarity occur within the electrodes.

   What this means is that whenever the electrolysis process is first activated, the negative electrical current will be sent to the negative electrode (cathode) and the positive electrical current will be sent to the positive electrode (anode).

During the course of this ongoing electrolysis process, calcium will be attracted to the negative electrode and some of the calcium will affix itself onto the electrode surface. In order to 'remove' this calcium, a reversal in the electrical polarity will be done by the software-driven electrolysis process.

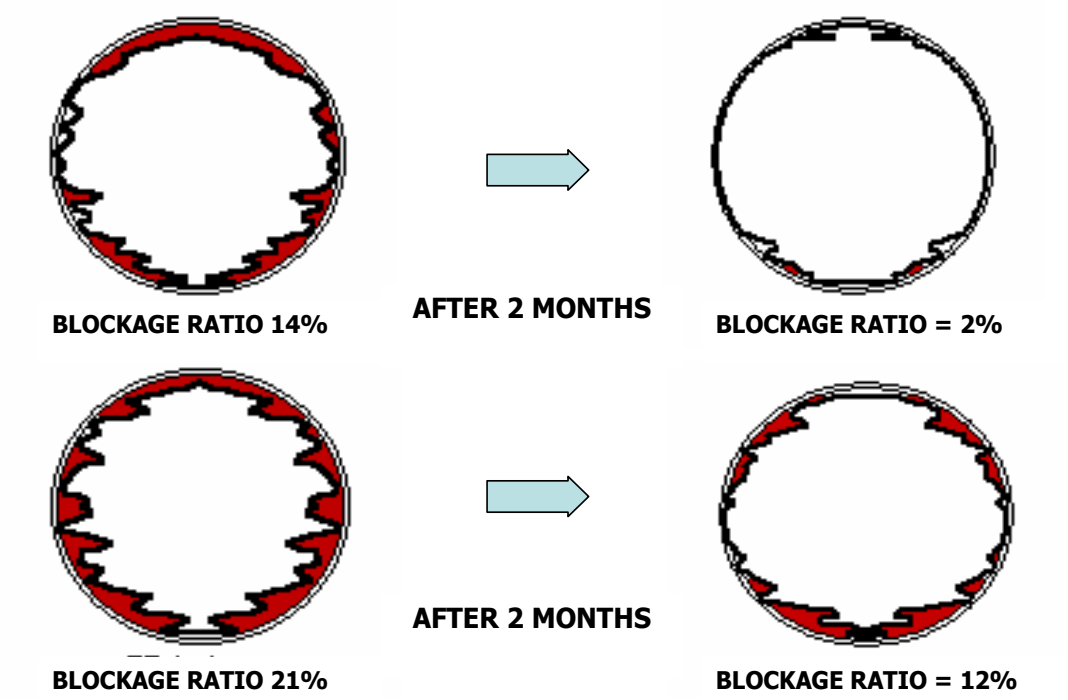
During the polarity reversal, the electrical current delivery will be reversed whereby what was the negatively-charged electrode will now become a positively-charged electrode and vice versa. Through this reversal process, which will occur on a pre-scheduled basis, a preventive measure prohibiting the buildup of calcium on the electrode has been implemented. Since the buildup of calcium on the electrode will degrade the entire descaling process, this is a key feature of the ElectroLife process.

Question: **For an optimal installation, what is the ElectroLife unit that you will install to process a cooling range of 50RT through 200RT?**

Answer: 1 ElectroLife unit is best suited to process a cooling range of 50RT ~ 200RT. However, an optimal setup for a 100RT capacity will be (1) ElectroLife unit and highly effective results can be seen after a 2 month period.

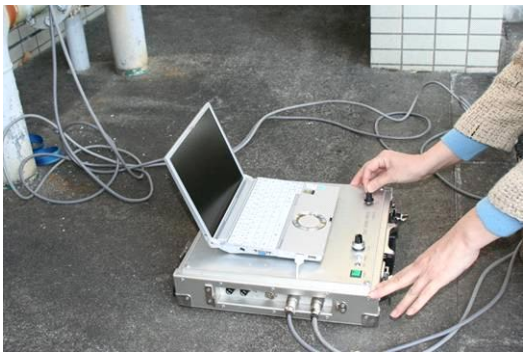
Question: **Can a simple process sequence be visualized and narrated utilizing the ElectroLife?**

Answer: **1. The following diagram will indicate the amount of blockage that is present followed by a reduction to the blockage after 2 months of exposure to the ElectroLife process.**



2. The following pictures will show the actual device that is used to determine the blockage levels prior, during and after the full exposure to the ElectroLife process.

IN CONJUNCTION WITH THE COMPUTER ANALYSIS, THIS DEVICE X-RAYS THE PRESENT STATE OF BLOCKAGE.



IN CONJUNCTION WITH THE X-RAY DEVICE THE SOFTWARE MEASURES THE AMOUNT OF BLOCKAGE.

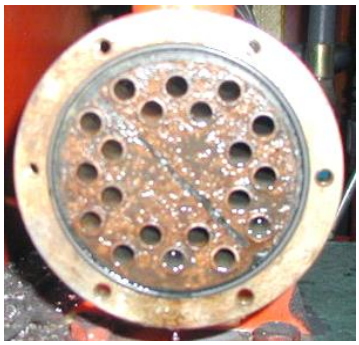
NOTE: This testing was done with the installation of a single ElectroLife unit with a cooling tower of 150RT.

3. The following sequential pictures will show the progressive effect of the ElectroLife process at a 2 week and 2 month interval.

(1) **(2)** **(3)**

PRIOR TO ELECTROLIFE

2 WEEKS INTO ELECTROLIFE



2 MONTHS INTO ELECTROLIFE

The first picture indicates the condition of the oil cooler water way 3 months after a chemical-based maintenance procedure was applied to it and prior to it being exposed to the ElectroLife process.

The second picture indicates the status after a 2-week exposure to the ElectroLife process. One can notice a better exposure of the individual waterways.

The third picture indicates the status after a 2-month exposure to the ElectroLife process.

4. The following picture shows the before and after exposure to the ElectroLife process of a waterway that is critical to a water flow used in an aluminum mold casting process.

[PRIOR TO ELECTROLIFE PROCESS] **[2 WEEKS INTO ELECTROLIFE PROCESS]**

5. The following sequential pictures, 1 through 7, show the progression before and after the exposure to the ElectroLife process for a Direct Vent System Cooling Tower.

(1)

SHOWS THE CONDITION OF THE COPPER PIPING PRIOR TO THE ELECTROLIFE PROCESS.

(2)

2 MONTHS LATER, A CLOSEUP OF THE COPPER PIPING IS SHOWN AFTER THE ELECTROLIFE PROCESS AND WASHING COMPLETED WITH A WATER SPRAY.

(3)

SIMILAR TO THE CLOSEUP PICTURE ABOVE, AND AFTER THE SAME 2 MONTHS OF ELECTROLIFE EXPOSURE, ONE CAN SEE THAT THE SOFTENING OF THE SCALING HAD TRANSFORMED THE ONCE NEAR -CONCRETE-LIKE STATE OF THE SCALING INTO MORE OF A MUDDY STATE.

(4)

A DIFFERENT VIEW OF THE PIPING MATERIAL, AFTER HAVING THE FINS REMOVED FROM IN BETWEEN THE PIPING, ONE CAN SEE THE SOFTENED SCALING ON THE PIPING.

(5)

ANOTHER DIFFERENT ANGLE OF THE COPPER PIPING, MINUS THE FINS, SHOWING THE SOFTENED SCALING PRIOR TO THE WATER WASH.

(6)

INDICATES HOW THE COPPER PIPING WAS EASILY WASHED DOWN TO REMOVE THE SOFTENED SCALING.

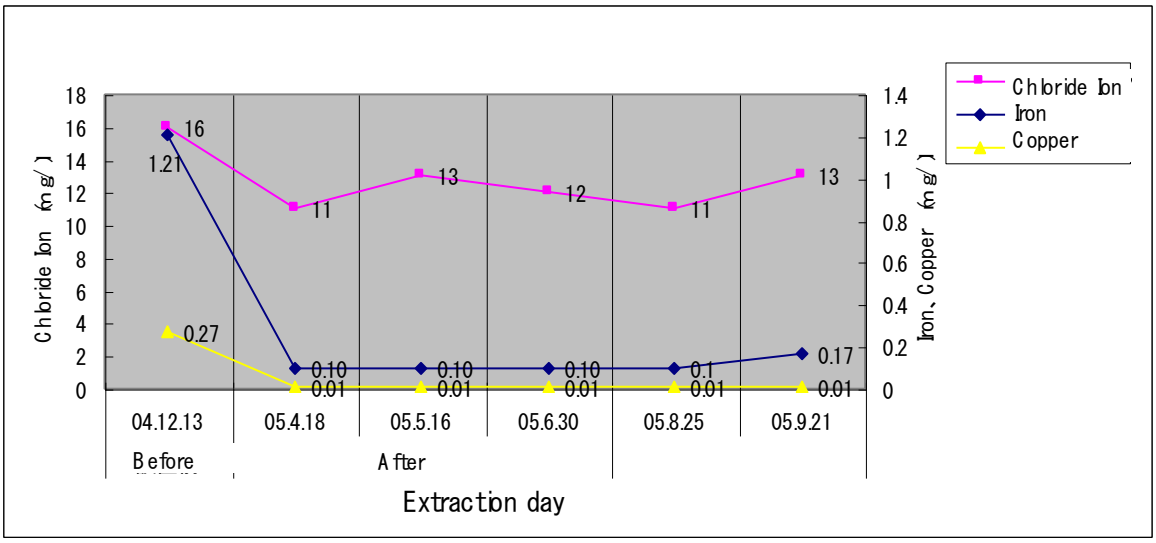
(7)

INDICATES THE STATUS AFTER A WATER WASH.

6. The following picture demonstrates, through the series of pre-scheduled filter replacements, how corrosion of the water way and piping had diminished over a 2 month period.

Looking at this picture from a right to left progression, the filters portray how each filter picked up lesser and lesser amount of rust than had previously existed in the water way.

On account of the ElectroLife process, diminishing the amount of corrosion and rust, each replacement of the filter at a 15-day interval, clearly indicates that rust had been effectively diminished.



THIS CHART SHOWS HOW THE CORROSION LEVEL OF THE PIPING HAD BEEN LOWERED AND HOW LESSER AMOUNTS OF IRON AND COPPER IONS WERE FOUND IN THE WATER.

QUESTION: Since the ElectroLife process improves efficiency levels and reduces energy consumption, are there statistics showing this?

ANSWER: The following chart shows this correlation.

LEVEL OF BLOCKAGE	RESULTANT POWER LOSS	ANNUAL LOSS IN DOLLARS	ANNUAL CO_2 CONVERSION
PIPE #100A WITH 58% BLOCKAGE	3.1 KW	$49,100.00	118 TON/YR
PIPE #125A WITH 73% BLOCKAGE	3.4 KW	$53,860.00	130 TON/YR

THE CONDITIONS FOR THE CALCULATION ON THE ANNUAL CO_2 CONVERSION INDICATED BY THE 118 TON/YR IS BASED UPON THE FOLLOWING CRITERIA:

Pipe Length: **100 meters**
Days in operation per year: **220 days**
Operational hours per day: **8 hours**
Kwh rate used: **$0.15 per kwh**

When water ways experience blockage through scaling attached to the piping, the burden on the circulation pump increases resulting in a measured increase to power usage. Additionally, due to the diminished capacity within the heat exchanging function there are two remedies that need to be applied.

1. Increase to the amount of circulation water, 2. A lowering of the temperature of the circulation water

When these calculations were made, the only factor that was calculated was the higher amount of energy usage required brought about by the diminished efficiency of the waterways due to scaling. The two factors consisting of increased water requirements and a lowering of the temperature of the circulation water was not included. If these two factors were included, it is theorized that the amount of increased energy costs, and a subsequent annual loss in dollars, would be closer to 4 times the stated amount. In certain instances, when these numbers were included into the calculation, an annual loss as great as 50 times was noted.

QUESTION: While understanding that all of the installations of the ElectroLife unit is located in Japan, who are some of the customers that have benefited from its use?

ANSWER: The following is a client base that has been assembled during the past 12 month period. Additionally, in the prior 12 month period, there have been a near equal number of installations utilizing the ElectroLife process.

CLIENT-INSTALLATION	UNITS INSTALLED
Enkei Wheels	**30**
Aishin (Subsidiary of Toyota)	**7**
Suzuki Automobile Manufacturing	**25**
Panasonic Home Appliance	**4**
Honda (Suzuka)	**4**
Yamaha (Fukuoka site)	**3**
Shin Nittetsu	**1**
JFE Steel (Chiba site)	**5**
Hitachi	**11**
Toyota	**3**
Other companies and sites (50)	**61**
Total units installed	**154**

QUESTION: Can you identify 3-4 clients, who have utilized the ElectroLife process, for a reasonable period of time, and relate a significant experience that they have had with the ElectroLife process?

ANSWER: The following 3 clients are provided with their individual benefits that they have experienced.

1. Enkei Wheel Company Limited

   This company is a manufacturer of after-market alloy wheels and is an established global brand. Their process involves aluminum foil manufacturing.

   This client's needs are focused on the efficient operation of the cooling tower process to ensure that an effective cooling function is applied to the aluminum molds, utilized in the formation of the alloy rims.

Under a normal cooling application, the entrance to the waterways for the outer moldings have a tendency of scale blockage occurring during every 2 weeks of use.

The installation of the ElectroLife process lessened this blockage from occurring as what was once a frequent 2-week period to a 8-week period. As a direct result of this minimized tendency for scale blockage, Plant Management noticed a 75% decrease in their Quality Control rejection rate. Their past rejection rate was at 8% of production, as noted in their Quality Control testing, which had been drastically reduced to 2% of production.

The direct valuation of the reduction to this defect-based rejection rate equates to $800,000.00 per year per factory.

2. Suzuki Company Limited

This company is a manufacturer of automobiles.

This client's needs are focused for maintaining an efficient cooling process within the equipment utilized for the cooling of paint based upon an electro-deposition coating function.

Under a normal cooling application, significant amounts of scaling was attached to the narrow copper tubing located inside the direct vent cooling system tower.

Through the installation of the ElectroLife process, and in a short 2-week period, the scaling attached to the narrow tubing significantly softened and through a simple water-spraying cleaning method, all of the scaling was able to be removed. Additionally, as a result of the ElectroLife exposure, a scale-free environment continues.

Historically, once every three years, a one-week period was spent disassembling and chemically cleaning the copper piping. The cost to this conventional cleaning process was approximately $20,000.00 whereas the ElectroLife-based cleaning process was approximately $2,000.00 resulting in a 90% savings. Since then, the scaling went down to a near-zero level and the savings in cleaning costs continue to date.

3. Yamaha Company Limited

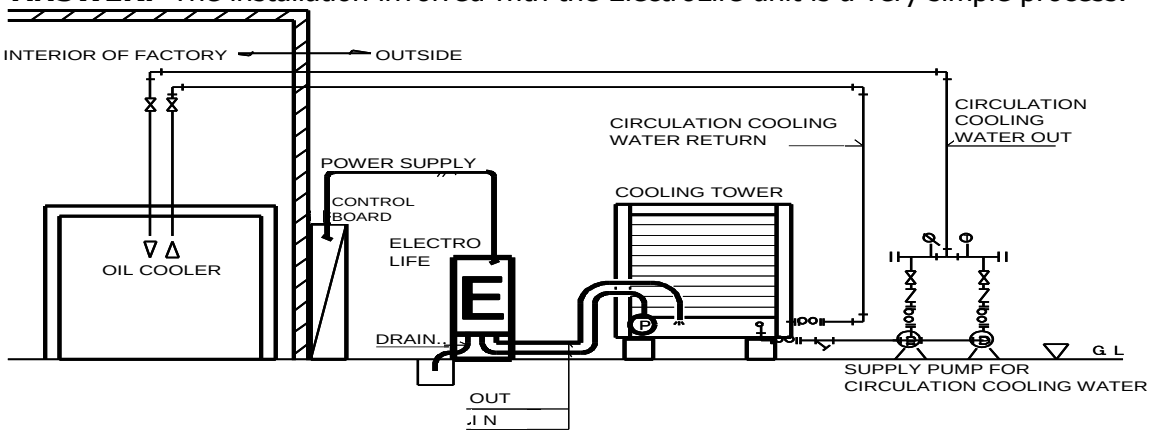
This company is a manufacturer of ocean-going ships.

This client's needs are focused on maintaining an optimal temperature, in the operating oil, for the presses. The objective was to control the temperature build up in the oil. Each time the oil heated up above the tolerant temperature, the oil needed replacing which cost $10,000.00 per replacement.

This problem was most prevalent in the Summer months. In conjunction to the oil temperature concerns, were the the standard issues that cooling system inefficiencies had created. These concerns were mitigated with the introduction of the ElectroLife process providing a nearly scale free condition.

QUESTION: What does a typical installation for the ElectroLife unit entail?

ANSWER: The installation involved with the ElectroLife unit is a very simple process.



1. The ElectroLife unit will be placed in close proximity to the main Heat Exchanging unit.

2. A single-phase AC 100V~240V, 50/60 Hz outlet will be required.

3. A hose which will be used in the circulation of the cooling tower water will be immersed into the 'sump' device of the cooling tower.

4. A drain hose, releasing the freed scaling and excess calcium that has been removed from the water, will be utilized to remove these two components.

Aside from these physical requirements, a standard routine of monitoring the ElectroLife unit is all of the required installation and operational needs.

QUESTION: Are there any last minute 'basics in thinking' that could be shared here with respect to the ElectroLife process and what it is doing?

ANSWER: Through this product booklet we are hoping that you were able to understand the fundamental objectives for utilizing the ElectroLife process.

Here are some summarizing thoughts.

In order for scaling to be minimized and for subsequent corrosion to the piping minimized, it is important that the circulation water be regulated. One important way in regulating the quality of this water is to not let the circulation water get overly condensed.

Since the cooling tower's system lowers the temperature of the circulation tower itself, and the with the natural evaporation of the circulating water occurring, the resultant-and-reduced level of the remaining water is increasingly comprised of the causative agents of scaling. With the

addition of the makeup water, the current level of mineral components and silica components found in the makeup water increases.

Simultaneously, with the pH of the circulation water moving to the side of an alkaline pH thereby creating an environment that is conducive to scaling. In order to minimize this from occurring, it is necessary to drain the circulation water at a certain level and to add makeup water.

The ElectroLife process increases the solubility of the circulation water, through the process of electrolysis, while contributing to the creation of a lesser ability for scaling to attach to the waterways. This condition prevails despite the circulatory water having a same level of concentration.

In addition to this, the software-controlled 'drain' function ensures the removal of scaling and minerals from the waterways at pre-determined intervals while further ensuring the high level of efficiency, through a reversal of electrical polarity, to minimize mineral buildup onto the electrodes.