



ZERO DISCHARGE

**Treatment Method for
Cooling Towers and Heat Exchangers with
SP3, I-SOFT-OB, OXYDES & KATALOX LIGHT**

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ISO + KL Applications, Part IV

Why consider this technology to all traditional chemical water treatment

- 1) Because Contaminants are destroyed (not separated or concentrated)
- 2) Because it is the most intelligent thing to do
- 3) Because there are no toxic chemicals involved
- 4) Because Instant Dosing Products reduce 95% of water used in conventional water treatment chemicals, which are associated costs for shipping, insurance, handling storage and disposal.
- 5) To descale systems which have lost heat transfer efficiency, without the need for service companies and dangerous acid cleaning.
- 6) To reduce the amount of water used in open cooling loop operation and associated costs for supply and discharge of Toxic Chemicals.
- 7) Eliminate all inorganic, organics, algae, bacteria, fungi including very difficult problems such as yeast and Legionella with the use of very simple biocide **I-SOFT OB** (Oxidizing Biocide) either as liquid or in the **INSTANT** powder form
- 8) To treat water without water softeners where the use of water softeners are forbidden or too costly because of salt and waste water costs.
- 9) To reduce the amount of sodium chloride (NaCl) in discharge to municipalities
- 10) It is easy to start up and stop

I-SOFT - OB (Oxydizing Biocide)

I-SOFT OB: is one of the unique Mixed inhibitor composes of three different types of proprietary formulation that works as

1. **Cathodic Scaling** prevented
2. **Anodic Scaling** and **Corrosion** preventer
3. **Oxidizer** including adsorption, dispersion and passivation technique used in **I-SOFT OB**

([See more](#) about I-SOFT OB)



I-SOFT OXYDES + KATALX LIGHT

The unique WATCH[®] strategy of water treatment is to control all

1. **Scale**
2. **Corrosion**
3. **Biofouling** and
4. **Filtration** only in one process technology without using any harmful chemicals and service and maintenance costs.

In this process Cathodic inhibitor (against scale) coats all the cation metals such as making a thin film to prevent free oxygen and water from coming into close contact with the metal surface. **I-SOFT** breaks the reaction cell and stops the Corrosion rates. **ONLY I-SOFT** treatment method can be used to stop scale and corrosion problems and to assure efficient and reliable operation on any kind of cooling water systems.

I and SOFT components

I = Cathodic **Scale** Inhibitor

It is very effective by formation of strong film on all Cathodic corrosion surfaces as to prevent any oxygen attack. It is much more effective than any other inhibitor and very low dosage level is required. Therefore it is the best choice to use in cooling water treatment. "I" does not contain any bicarbonate, metal cations and useless phosphonates or poly phosphates.

SOFT = Anodic **Corrosion** Inhibitor

It is capable of forming a protective oxide inhibitor film to cover all the anodic corrosion points inside all the cooling water circulation systems. This method of dosing **SOFT** is effective to keep all points under protection film and isolate from corrosion initiators like sulfates, chlorides, silicates and nitrates including hydrogen sulfide. Therefore sufficient safety margin shall be applied and should be dosed as to Watch Water Instructions. 20 mg/L should be applied in the feed water. All other hazardous anodic inhibitors like chromates, nitrites, orthophosphates, molybdates are not used in **SOFT** formulations.

I-SOFT

I-SOFT as a mixture of three types of inhibitors having the proprietary scale and corrosion inhibitor formula is classified as "**MIXED INHIBITOR**" category. Since the chemicals used in this formulation have different characteristics supplement to their mutual deficiency, the overall efficacy of the **I-SOFT** increases. Hence, dosage concentration reduces to half, and this lowers the operating cost of all the cooling towers and environmental impacts caused by phosphates, phosphonates, heavy metals as they are not biodegradable. **I-SOFT** is **100% Biodegradable**.

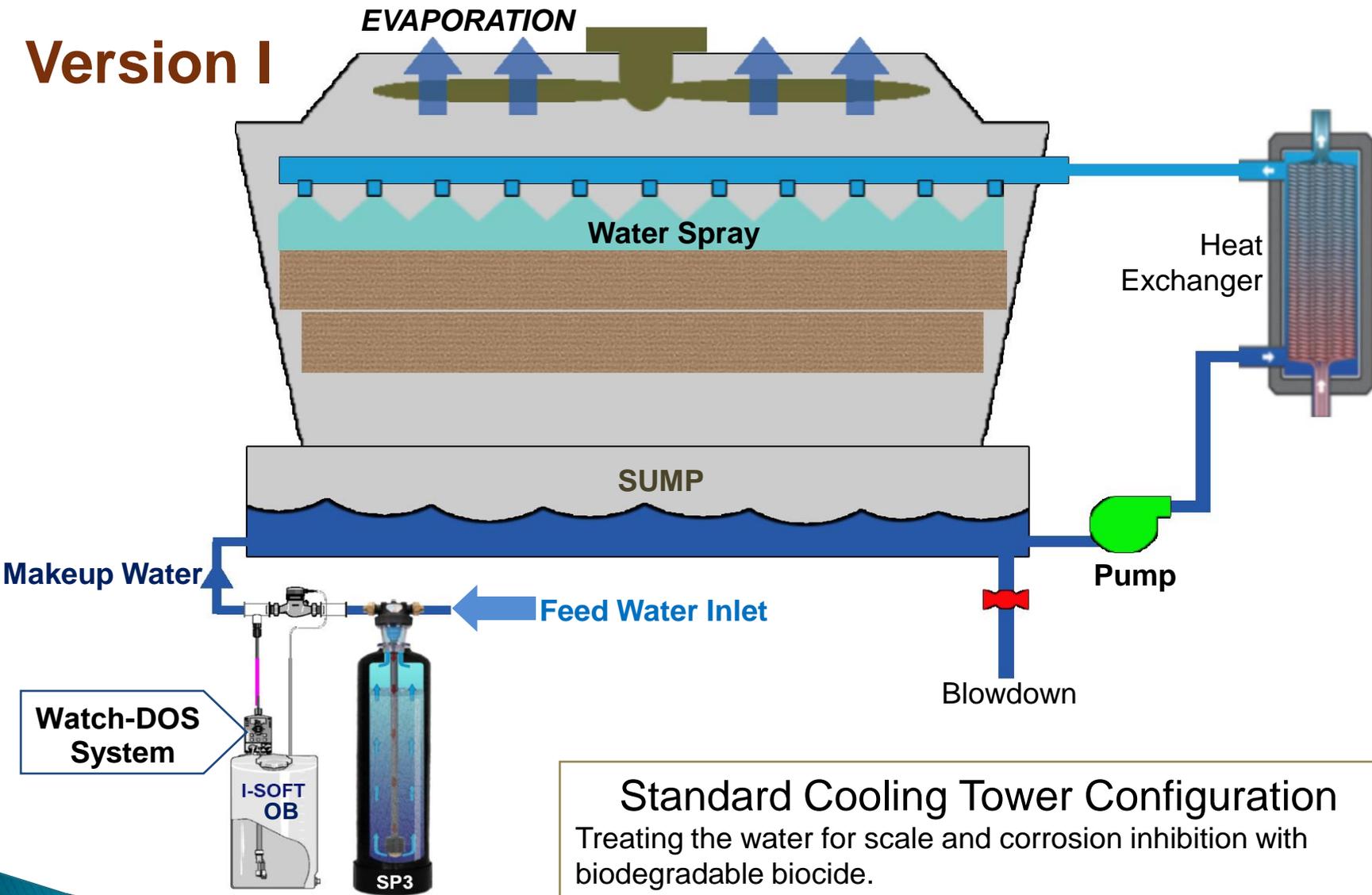
OXYDES Chemistry for Green Biocide:

In order to understand the function of **I-SOFT OXYDES** and **KATALOX LIGHT** in the cooling water treatment it is helpful to have a basic knowledge of the **ISO + KL** ([Online Learning](#)) involved.

Hydroxyl radicals (OH) is one of the Strongest oxidants that is available in Watch® Water Chemicals toolbox. **OXYDES** is extremely reactive and degrades promptly any available organic molecules. Hydroxyl radicals, likewise other reactive oxygen species, are also very **POTENT BIOCIDES** which vigorously attacks microorganisms and tissues, damaging cell membrane lipids, proteins carbohydrates and RNA/DNA. **OXYDES** hydroxyl radical reactions are extremely fast, having a rate constant ranging between 10^7 to $10^9 \text{ M}^{-1} \text{ sec}^{-1}$. Consequently the **OXYDES** hydroxyl radicals only diffuses the equivalent of 5 -10 times of its molecular diameter before it reacts.

Standard Cooling Tower Configuration

Version I



Standard Cooling Tower Configuration
Treating the water for scale and corrosion inhibition with biodegradable biocide.

Standard Cooling Tower Configuration

(continues from slide 8)

All cooling towers functions to cool a circulating stream of water (see figure **Version 1**). The tower acts as a heat exchanger by driving ambient air through falling water, causing some of the water to evaporate (evaporation gives off heat- providing cooling) and then circulates cooled water through whatever equipment needs for cooling. The chemicals used are typically such as chlorine, phosphates, phosphonates, polyacrylates and chelates such as EDTA and NTA to control biological growth, formation of bio-films and to inhibit the scale and corrosion and none of them are biodegradable, thus polluting the environment. **I-SOFT OB** is a GREEN FORMULATION to control the bio-film and scale formation, which are essential in maintaining cooling tower heat transfer efficiency.

Standard Cooling Tower Configuration

(continues from slide 9)

As the water volume in the tower is reduced through evaporation and drift the concentration of **I-SOFT OB** increases in the sump. As all cooling towers picks up organic contaminants from ambient air, to maintain chemical and contaminant concentrations at a prudent level, water is periodically removed from the system through a process called "BLOWDOWN" or "BLEED OFF". Blow down water must subsequently be discharged to a local wastewater treatment facility or discharge onsite to the environment. The blow down contains organic materials as well as phosphates, phosphonates or chelates like EDTA or NTA materials. The local wastewater treatment facility will charge extra sewage fees for this polluted water or may not even accept this water. These costs can be quite significant in the overall operation of a cooling tower.

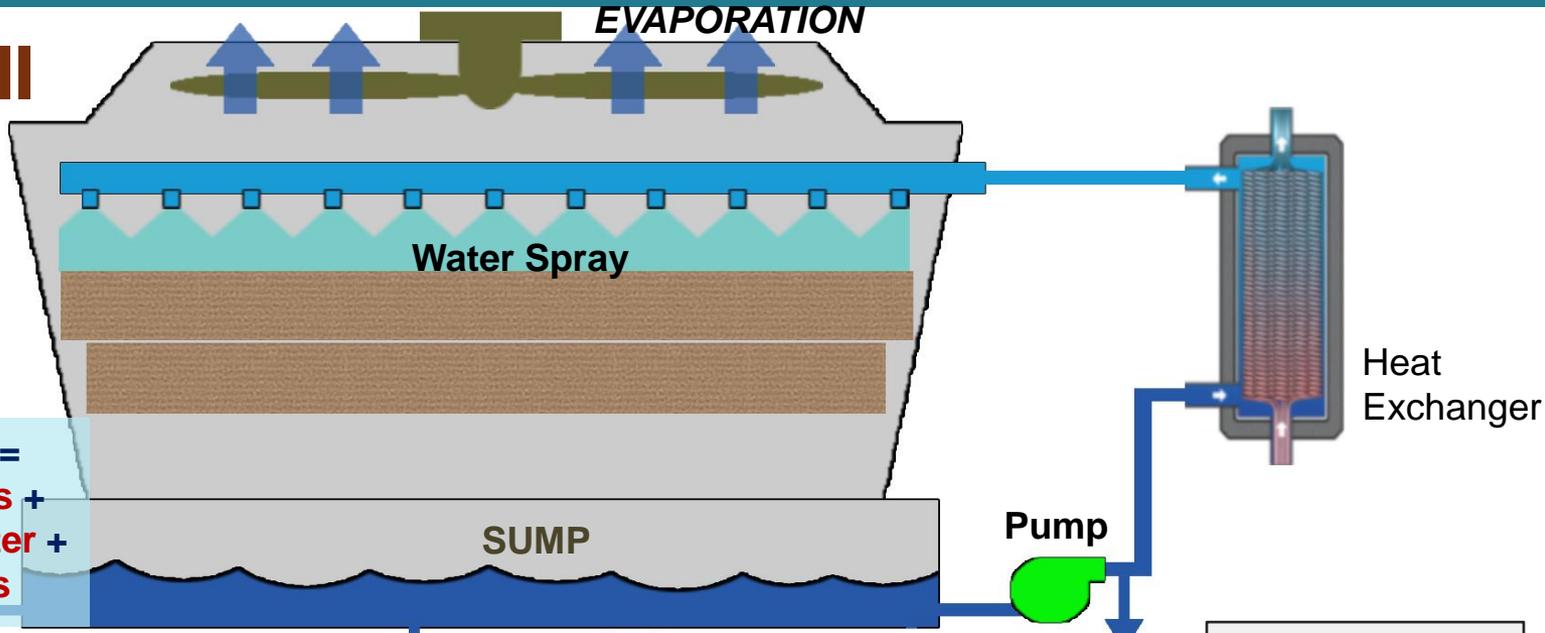
ZERO DISCHARGE configuration

Discharge of the blow down water to the environment onsite is forbidden and is coming under increasing regulations because of the contaminants like phosphonates, molybdates, chromates, copper, nitrites, orthophosphates are still available in blow down water.

Watch has solved all these blow down problems to **ZERO DISCHARGE**. Watch treats the "makeup" water with **FILTERSORB SP3**, involving **ZERO** regeneration salts or chemicals and **ZERO** Backwash water and **ZERO** waste water. Dosing **I-SOFT OB** is circulated back to the makeup water after a **UNIQUE** combination of **I-SOFT OXYDES** and **KATALOX LIGHT** filtration (see Version II, *next slide*).

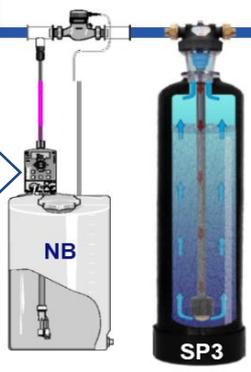
ZERO DISCHARGE configuration

Version II

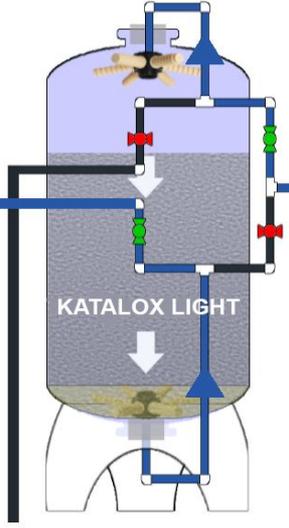


Makeup Water =
Evaporation loss +
KL backwash water +
5% others loss

Watch-DOS System



Feed Water Inlet



Backwash dependent on pH or conductivity control



Filtrating the SUMP water once/twice a day, thus saving a significant amount of water from going to waste

Benefits of using ISO + KL System

The oxygen (O) and hydroxyl (OH) radicals generated in this process will destroy all organics, inorganic and will dissipate quickly and would not be found in the makeup water. The water will be crystal clear and reduce the consumption of chemicals. Only an addition of non-oxidizing biocide is needed to kill Legionella. As a result, huge cost savings accrued from decreased chemicals costs and water use requirements as well as from a **ZERO discharge wastewater volume**. There are hundreds of benefits to the environment with **NO discharge of Hazardous chemicals** like phosphates, phosphonates, molybdates, EDTA and NTA compounds and other chemicals discharged. **ISO + KL** smart systems should require very little maintenance and costing per years compared to conventional chemical or ozone systems.

Conclusion

There are many references that using **FILTERSORB SP3** with a combination of **I-SOFT** also acts like a de-scaling agents. The premise is that CO₂ oxidizes the biofilm that serves as a binding agent adhering to scale of heat exchangers' surfaces. When scale build-up on condenser is reduced, higher "HEAT TRANSFER" rates are achievable. Increasing the condenser heat transfer rates reduces the chiller head pressure, which then allows the chiller to operate more efficiently and consume less energy.

Thanks to FILTERSORB SP3

The Plant friendly Technology

We would like to customize a Residential, Commercial or Industrial system to meet your needs. Please contact us at info@watchwater.de

END OF PART IV

Thanks