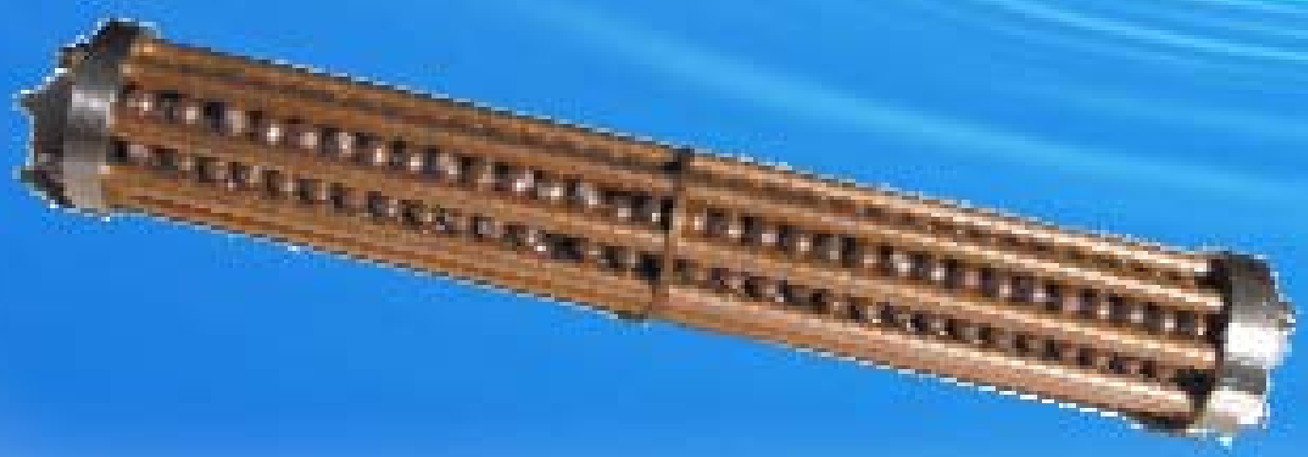
What's

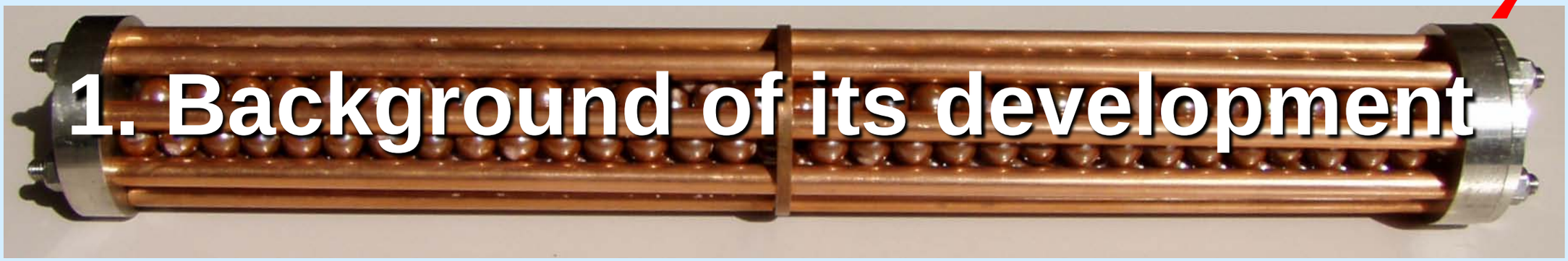
Aquxite Cleaner?

Cooling water treatment device for Circulation system
through producing and supplying functional ceramics



We charge to health and environment

Aquxite Co.,Ltd.



1. Background of its development

冷却塔等の保全にて溶剤式やノンケミカル式の方式がありますが以下の問題を
ノンケミカルで一括で解決できる機器が無く、ユーザーニーズがあった。

1. **Cleaning of cooling towers requires hard work under the poor conditions. full of sludge, microbe and mineral deposition**
2. **These foreign matters sometime block discharge openings**
3. **Bacteria or Legionella bacillus can scatter giving neighbors a trouble**
4. **Throwing sterilizer accelerates on the other hand corrosion of the equipment**
5. **Mineral deposition in the heat-exchanger pushes up electricity cost.**

2-1. Mechanism of Water Purifying

Scale dissolution / prevention mechanism

- $Ca(CO_3)_2 + CO_2 + H_2O \leftrightarrows Ca(HCO_3)_2 + CO_3^{2-}$

  Equilibrium is needed

$Ca(CO_3)_2\downarrow + CO_2\uparrow + H_2O \leftarrow Ca(HCO_3)_2$

Water quality deterioration causes CO_2 defficiency resulting $CaCO_3$ deposition

$Ca(CO_3)_2 + CO_2\downarrow + H_2O \rightarrow Ca(HCO_3)_2 + CO_2^{2-}$

As reduction effect by ceramics, $Ca(CO_3)_2$ dissolves making $Ca(HCO_3)_2$, then equilibrium is maintained（基本に沿った対処）

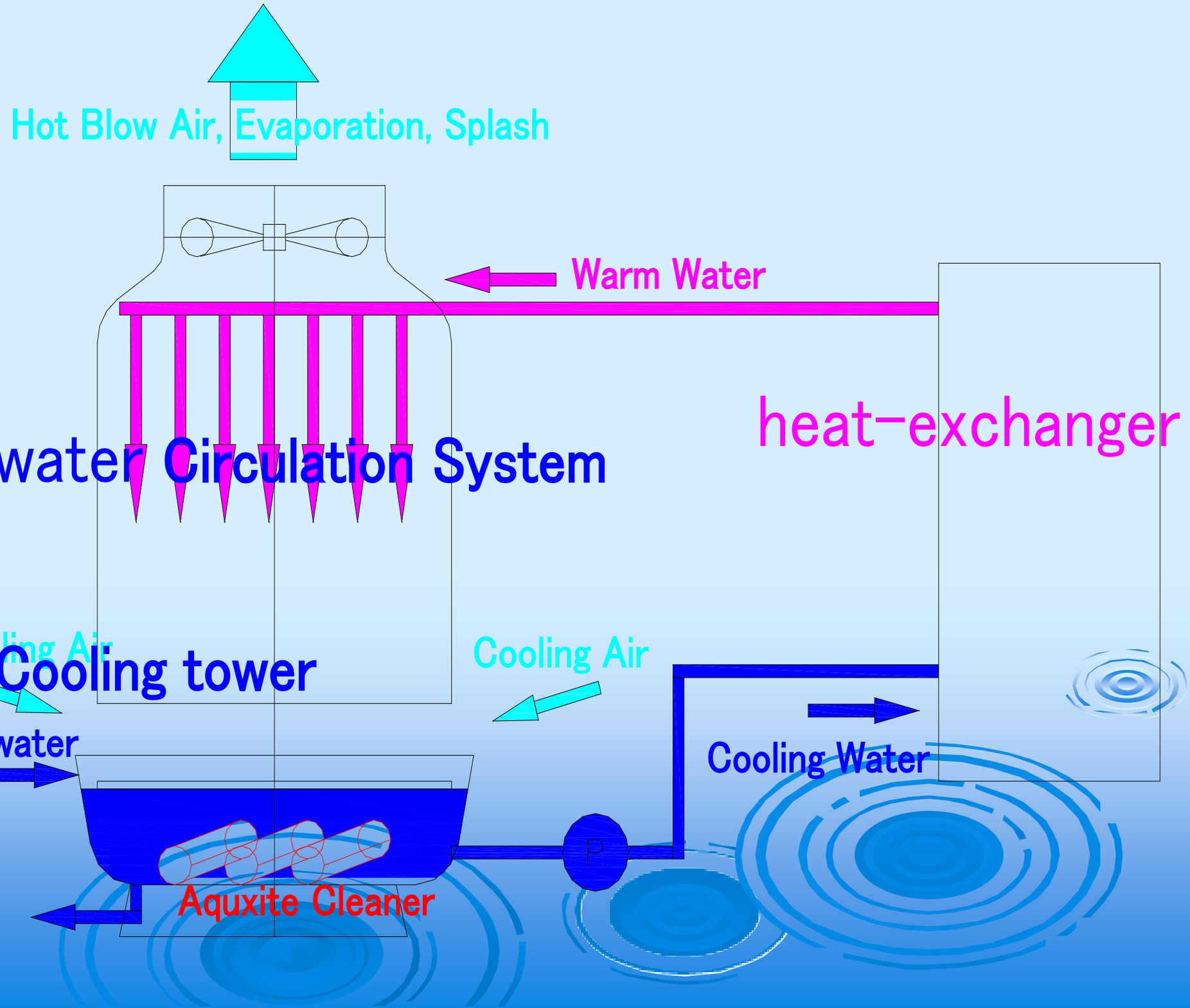
銅金属の銅イオンの浸出により殺菌機能を備えている

Cu ion leaching untied with the above reduction environment has anti-bacteria effect

上記、セラミックによる還元雰囲気と一体と成り抗菌効果の発揮

2-2. Install of Aquxite cleaner

Cooing tower



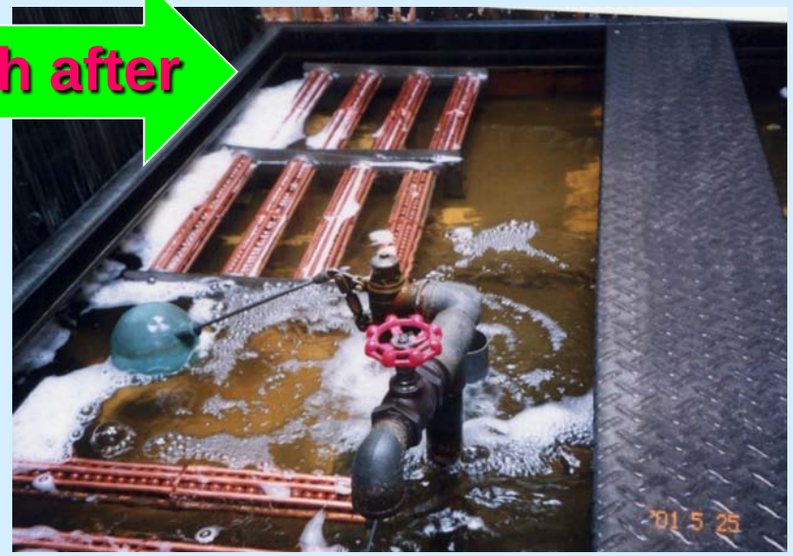
3-1. Operation condition(1)

Solubility and Anti-bacteria

Just after installation, The water is cloud

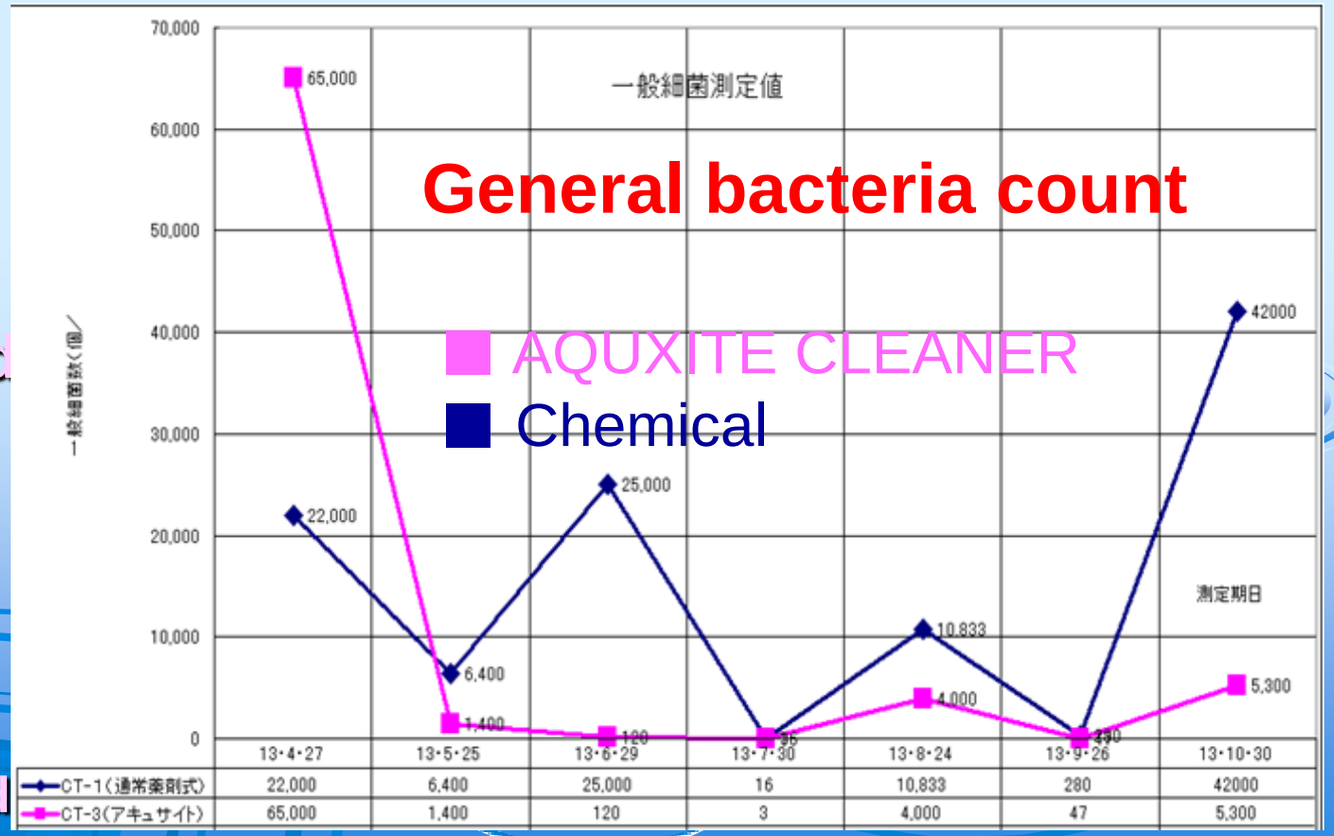
Before installation

1 month after



After
Water cleanses increased

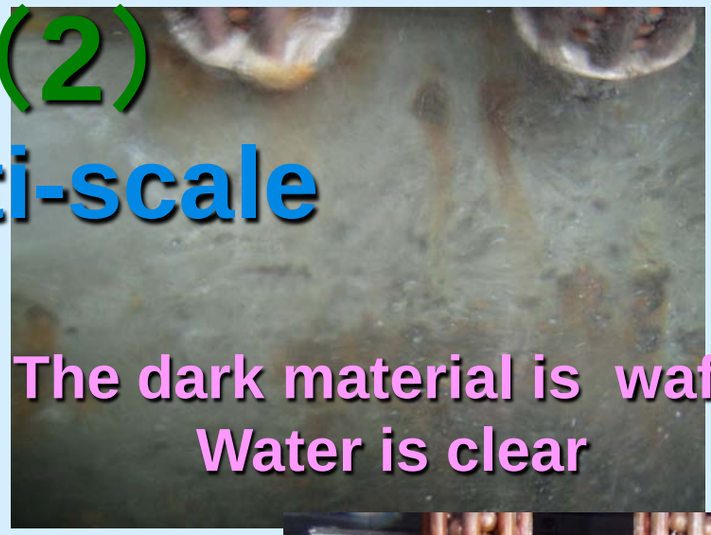
Dirt on submersed part of the float is removed



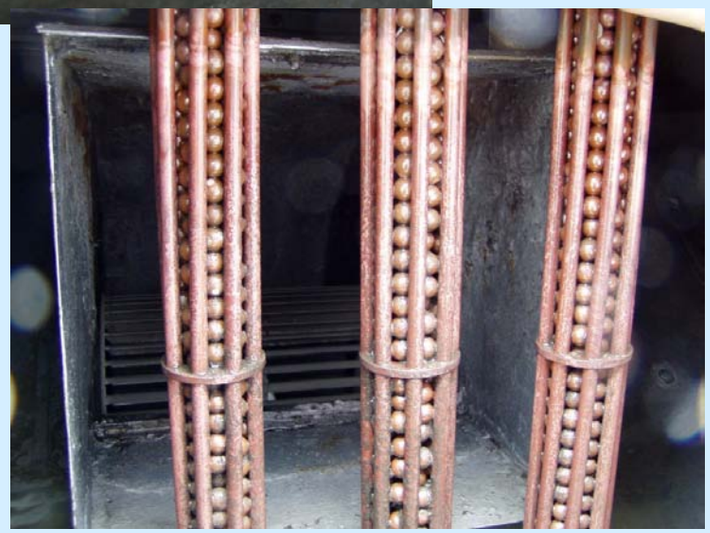
3-2. Operating condition (2)

Anti-corrosion、Anti-scale

Rust effluent and sludge deposition
Water is clear



The dark material is wafts
Water is clear



Need to clean
Aquxite Cleaner

Before installation

4 months after

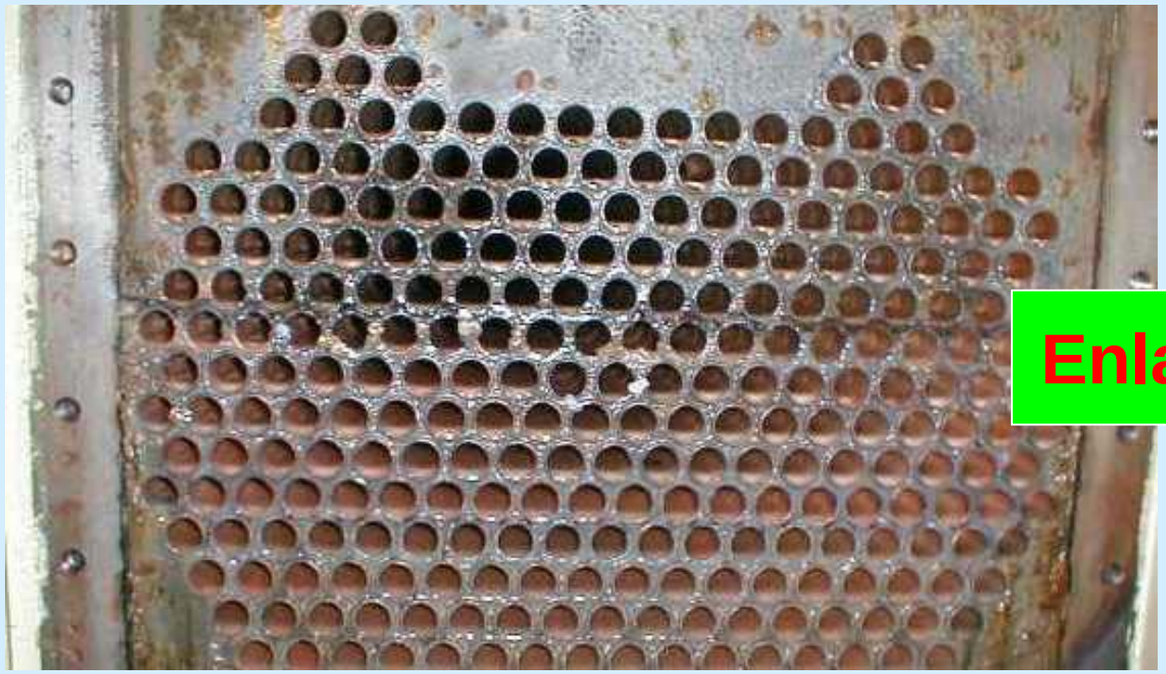
After(4 months)
Progress of rust deposition stopped

1 year after

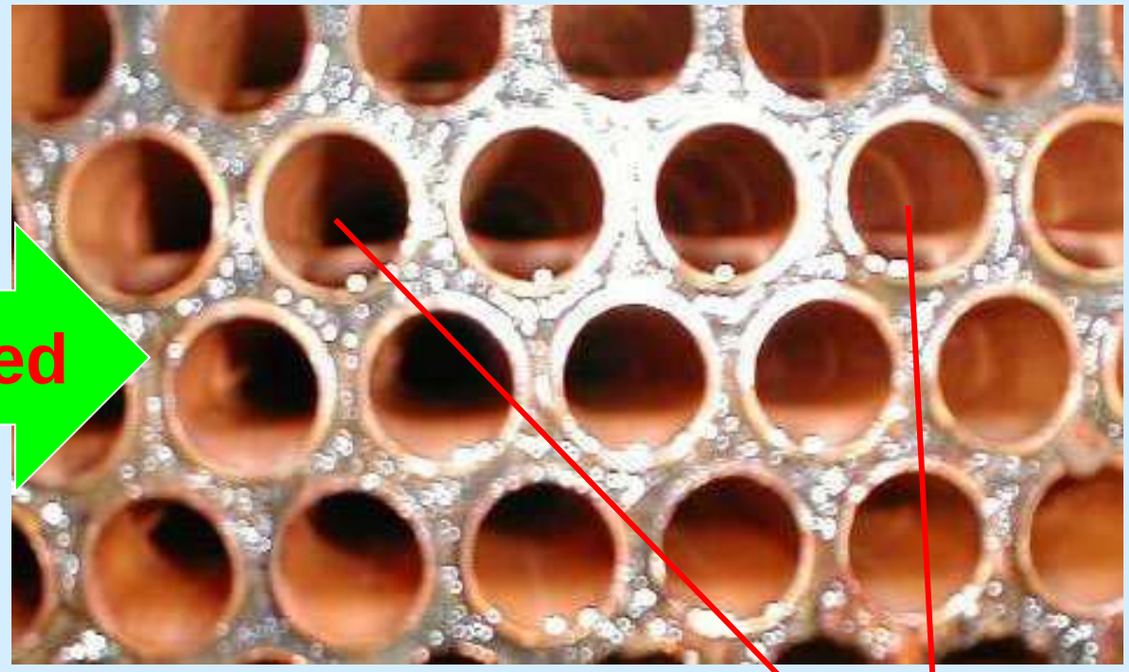
After(1 year)
Rust and $CaCO_3$ have gone

3-3. Experiment and Result
～The Boiler Case～

After 6 months



Enlarged



-Still in very good condition
-No calcium carbonate stain

Still very clean inside each hole
even after 6 months use

4-1. Comparison and Evaluation

which Water		JRA	Cooling Water		Makeup Water	Cooling Water
What Facility		Cooling Water	Station building		Beer Brewery	
			Chemical	(for 1 month)		(for 2 months)
Outlooking		Transparency	Turbid of Yellow Substances	Turbid of Yellow Substances	Transparency	Transparency
Ph		6.5～8.2	8.7	8.9	8	8.8
Oxygen amount of Acid	$CaCO_3$mg/ l (pH4.8)	＜100	170	300 ※1	94	160 ※1
Calcium Hardness	$CaCO_3$mg/ l	＜150	210	450 ※2	81	150
Chloride Ion	Cl^-mg/ l	＜200	110	220	21	39
Sulfuric Acid Ion	SO_4^{2-}mg/ l	＜200	140	290 ※2		
Ionic Silica	SiO_2 mg/ l	＜50	36	60	57	110 ※2
Common Bacteria	個／m l		32,000	14,000※3		
Total Hardness	$CaCO_3$mg/ l	＜200	270	610 ※2		

※1 The consumed amount of asid is more than we expected, but still remain water transparency.
※2 The result of the amount is bigger than chemical one, but no scale occurred.
※3 Succeeded Inhabiting of bacterial growth.

4-2. Initial & Cost Down Summery

<Initial Cost>

Cooling Tower Size	m3	Aquxite Cleaner	Cost
10RT	7.8	1 pc	US$ 1,800.-
100RT	78	10 pcs	US$ 18,000.-

Calcuration based on the above

<Cost Down>

Erectlicity	1kw/h	Cost/hour	1 day(12hs)	365 days
250kw/h	US$ 0.10	US$ 25	US$300	US$ 109,500
				↓10% less
			You can save annually→	**US$ 10,950**
Chemical				**US$ 6,250**
		Total Cost Down annually		**US$ 17,200**

You can get back the Initial Cost in a year

4-3. Comparison Chart

~Cleaner and Chemical~ 100RT

	Aquxite Cleaner	評価	Chemical	評価
Initial Cost	6 Cleanersx¥150,000 =¥900,000.- Instllation fee: 6 Cleaners=¥ 60,000.-	×	¥500,0000.-(Newly Install)	○
Running Cost	Cost of cleaning and Check ¥50,000/year	◎	Chemical Cost ¥200,000 Cleaning Cost ¥200,000 =¥400,000/year	×
Cost Comparison (for 2 years)	**total ¥580,000.-/year**	◎	**total ¥850,000.-/year**	×
Stress for Cooling Tower	Inhibiting deposition for hard calcium carbonate and silica, and less stress for equipments.	◎	Difficult of removing the calcium carbonate and silica on heat-exchange equipment (inside tubes, contents), and chemical gives lots of stress for it.	○
Energy Saving	Annual Saving Energy: ¥300,000 appx	◎	10% lower thermal efficiency(about 10% cost up) if 0.6mm silica attache inside of tubes.	○
Effect for pipe and other facility	Once Aquxite Cleaner removes bad substances in it, keeps in good condition	◎	Even after doing chemical treatment, still needs regular maintenance.	×
Effect for water environment	Aquxite Cleaner makes circulation cooling water clean, then you can get safe and stable operation.	◎	Chemical Treatment inclusive of N(nitrogen) and P(phosphorus) normally. You have to do drainage measures in future.	×
Cost Saving of Water	Works even for high density substances in water and can save water as well.	◎	You need adjusting of chemical volumes depending on the density substances in water,may need additional ¥60,000 for case.	×
Overall Evaluation(Cost shown is average for 5 years)	It is effective at least more that 5 years. Big advantage on saving energy, water and running cost. Saving ¥8,000/year	◎	You need to invest for renewing the equipments in shorter period, as well as regular cleaning is necessary for them. Additional ¥760,000 /year	×

4-4. < Comparison of Cooling Tower>

	Chemical Treatment		semi Chemical		Non Chemical	
			Tourmaline, Magnetic,		**Aquxite Cleaner**	
	to do		to do		to do	
Maintenance	Maintenance timing depends on condition with 3D works	△	No solution for Organic substances	○	Effective no matter if Organic or Inorganic	◎
Equipment Life	causes of antibacterial oxidization. Mineral substances attachment	△	causes of antibacterial oxidization. Mineral substances non attachment	○	Keep stable condition without Oxidization Keep stable condition without staining mineral substances	◎
Antibiotic Action	Unstable antibacterial effect	△	Unstable antibacterial effect	△	Stopping or less harmful substances by Aquxite Cle	◎
Thermal Efficiency	Unstable Efficiency and even worse Also Organic film attached	△	Unstable Efficiency and even worse Less effective due to Organic antibacterial	△	Stable Operation(more than 10% than others) can not remove remained mineral substances	○
Running cost	Equipment cleaning is necessary with costs, impossible fully-treated.	△	Equipment gets oxidized, shorter life and need chemical treatment	○	Very easy maintenance of cleaning the equipments with jet-washing and long life.	◎
Initial cost	No need investigation for any equipment.	◎	Costs equipments for initial instllation	○	Costs of Aquxite Cleaner can cover much enough for all the cost of Chemical treatment and less operation.	○
Overall	100	○	70	○	50	◎

5-1 Who are using Aquxite Cleaner in Japan

more than 500 cleaners Working on

～Hokuriku～
-Silk manufacturing
-Textile manufacturing

～Tohoku～
-Supermarkets

～ Kyushu Area～
-Rubber manufacturing
-Plastic Sheet manufacturing
・Press industry

～ Capital Area ～
-Beer Brewary
-Confectionary Company
・University of Medical
・Aero Electronic Company

～Kansai Area～
-Air-conditioning manufacturing
-Car manufacturing
-Rail way Company
-Oil Compressor manufacturing

～ Tokai Area～
-Tabacco Company
-Air-Conditioning anufacturing