“The Conditioner for the circular cooling system”
accorded in the ISO14001



CALFA BAS

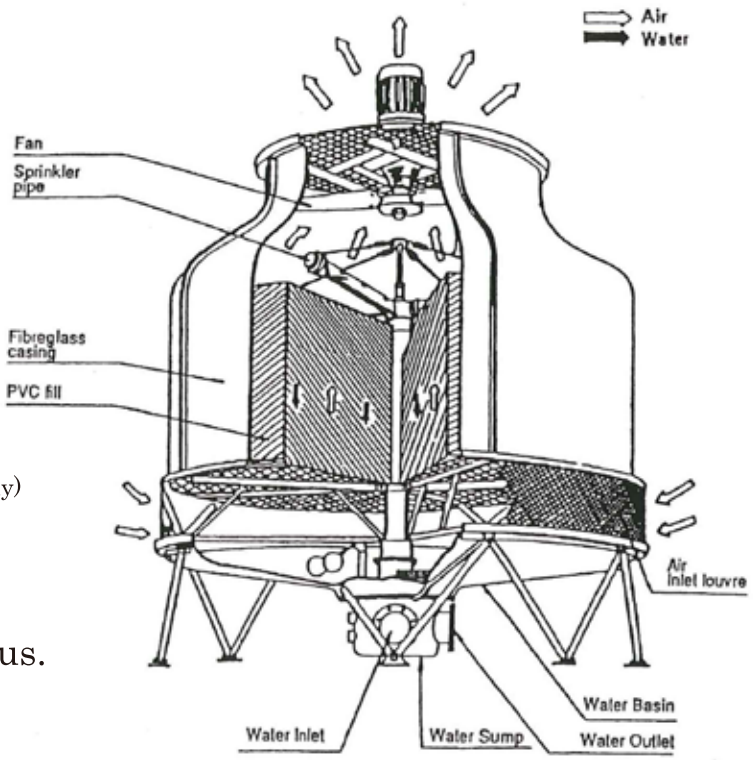
A Water Treatment Preparation friendly to the Environment

CALFA “ BAS” is an inorganic water conditioner ,economical, safe and easy to handle with remarkable effects, replacing the management of the circular cooling water by organic compound chemicals.

CALFA BAS

Features

- Silica scale will become soft and mixed Calcium scale fall off.
- To clean all water circuits. (CT,HEX,Pipes)
- To suppress local corrosions with its rust-preventive effect.
- Just to place in water of cooling towers.
- Effects will continue for six months after its Placement. (CT operates for 10h-12h per day)



The Main Components

- Classified to the Water-soluble Amorphous.
- Ingredients : SiO_2, Na_2O, B_2O_3, Ag_2O
- Usage Method :
  Against the Circulation Water (m^3/h) of the cooling tower, use it at the Flow Rate (standard) of 0.002% (20ppm)

Example of its placement sites



Application site at a leading iron manufacturer



Placement of "BAS" (Example 1)



Placement of "BAS" (Example 2)

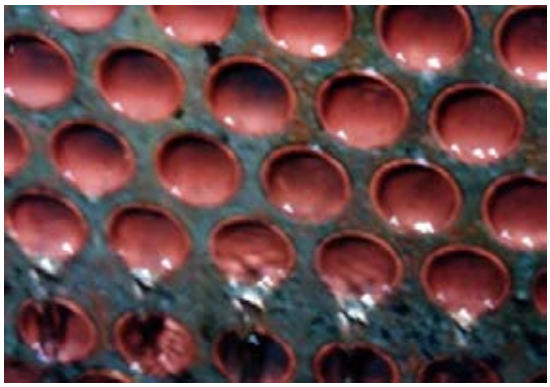


Placement of "BAS" (Example 3)

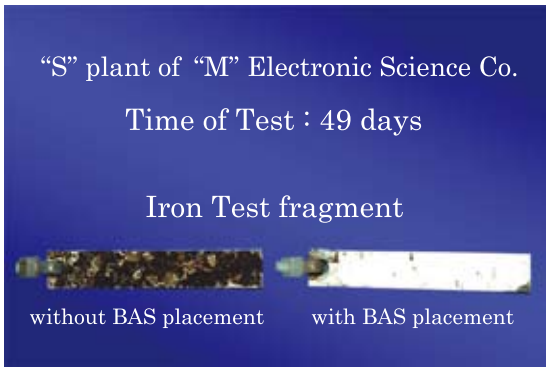
Comparative Tests



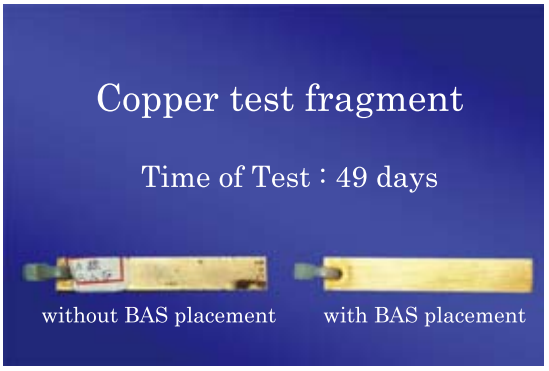
CONDENSER（without “BAS” placement）



CONDENSER（with “BAS” placement）



Metal（Iron）Control Test



Metal（Copper）Control Test

SCALE PREVENTION MECHANISM OF “BAS”

Because of the process of the following reactions caused by Sodium (Na) and Silicon (Si) included in “BAS” as its components, the forming of scale will be prevented in water.

★ Against the SCALE having a silicon component:

$SiO_2 + 2NaOH \rightarrow Na_2SiO_3$ (water-soluble) $+ H_2O$

★ Against the SCALE having a calcium component:

$Ca(HCO_3)_2 + 2NaOH \rightarrow Ca(OH)_2$ (break up) $+ Na_2CO_3 + CO_2 + H_2O$

$CaCl_2 + 2NaOH \rightarrow Ca(OH)_2$ (break up) $+ 2NaCl$

$Ca(HCO_3)_2 + SiO_2 + 2NaOH \rightarrow CaSiO_3$ (break up) $+ Na_2CO_3 + CO_2 + 2(H_2O)$

$CaCl_2 + SiO_2 + 2NaOH \rightarrow CaSiO_3$ (break up) $+ 2NaCl + H_2O$

★ Against the SCALE having a magnesium component:

$Mg(HCO_3)_2 + 2NaOH \rightarrow Mg(OH)_2$ (break up) $+ Na_2CO_3 + CO_2 + H_2O$

$MgCl_2 + 2NaOH \rightarrow Mg(OH)_2$ (break up) $+ 2NaCl$

$Mg(HCO_3)_2 + SiO_2 + 2NaOH \rightarrow MgSiO_3$ (break up) $+ Na_2CO_3 + CO_2 + 2(H_2O)$

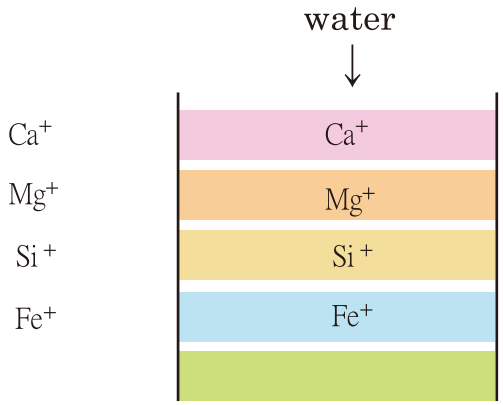
$MgCl_2 + SiO_2 + 2NaOH \rightarrow MgSiO_3$ (break up) $+ 2NaCl + H_2O$

CALFA BAS

Differences between CALFA "BAS" and organic chemicals

Organic Chemicals

Not crystalize Ca^{+}・Mg^{+}・Si^{+}・Fe^{+} etc. in water.
Cannot remove scale.



Not Crystallize them

The scale-component concentration in water will rise.

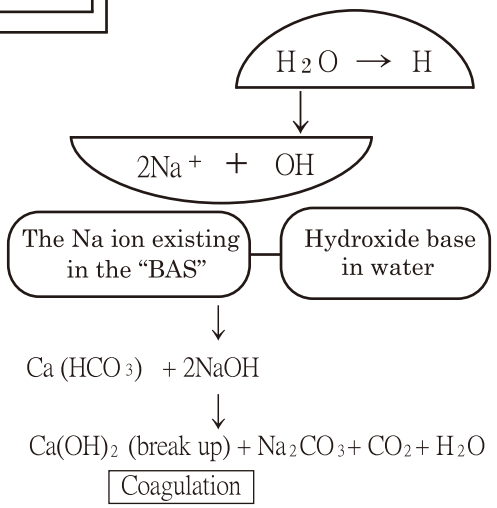
- The regular water quality analysis and the chemicals'concentration control will be needed.

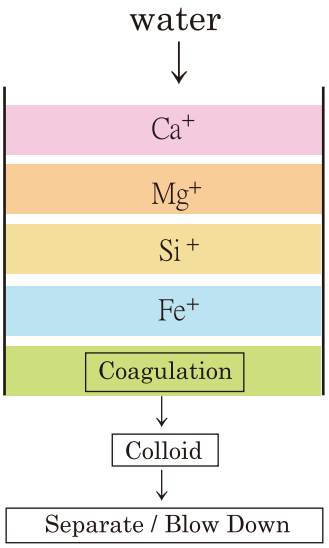
  When the balance of this management is violated, the crystallization will occur. When crystallization's preventive limits are exceeded, the scale will form rapidly.



CALFA BAS

Ca^{+}・Mg^{+}・Si^{+}・Fe^{+} etc. in water will be coagulated into colloid, then separate or Blow Down . Can prevent scale and remove it.





SCALE PREVENTION MECHANISM OF "BAS"

- Coagulated impurities (inclusing SS:Suspended Solid) to an appropriate level and blow down from Cooling Water, or to install Fileter / Separator.
- The water is made to be cation, thereby preventing the system from corrosion. (The corrosion occurs due to the mixture of anion and cation).
- 2NaOH converts SiO_2 which a scale binder momentarily into water soluble Na_2SiO_3, thereby turning scale into being soft and mixed Calcium scale removed.



Safety: The safety of CALFA "BAS"has been confirmed through tests for Oral Toxicity, Mutagenicity, and Skin Irritation, which were implemented in EU(European Union).

The effectiveness as Scale Remover

For PROFFESIONAL ENGINEERS

CALFA "BAS" removed Silica and Calcium Scale on surface of copper tubes of the closed circuit cooling tower as follows. It was recovered fully rated thermal performance after cleaning by CALFA "BAS".


Instllation day


1 month later


2 months later


Removed Scale

The conventional washing methods such as Acid Washing, The cooling systems had to be stopped while washing. CALFA BAS can remove scale from Heat Exchanger , Copper Tubes like above pictures while running the system.

- It's recommended to use "CALFA SAT" (Bactericide) together for cooling towers which suffer from much bacteria, algae and any organism problem.



Circulating Flow Rate vs. CALFA "BAS"

Place "BAS"at the following rate: 20 ppm (0.002%) against the amount of the Circulating Flow Rates (m3/h).

(Example: 100m^3/h × 0.002 %= 2.0 kg)

Cooling Tower Volume of Refrig. ton (RT)	Circulating Flow Rates		Holding Water (Liter)	Pipe diameter (mm)		CALFA"BAS" 20ppm(0.002%)
	m^3 /h	L / min		Circ. tube	Supply Tube	
60	46. 8	780	1,300 ～ 1,600	100	20	1. 0 kg
70	54. 6	910	1,700 ～ 2,200	100	20	1. 0 kg
100	78. 0	1,300	2,300 ～ 3,000	125	20	1. 5 kg
150	117. 0	1,950	3,400 ～ 4,300	150	25	2. 5kg
200	156. 0	2,600	5,000 ～ 6,600	150	25	3. 0 kg
250	195. 0	3,250	6,500 ～ 8,300	200	32	4. 0 kg
300	234. 0	3,900	7,500 ～ 10,000	200	32	5. 0 kg
400	312. 0	5,200	8,500 ～ 11,000	150 × 2	50	6. 5 kg
500	390. 0	6,500	10,000 ～ 13,000	200 × 2	50	8. 0 kg
600	468. 0	7,800	13,000 ～ 17,000	200 × 2	50	9. 5 kg
700	546. 0	9,100	15,000 ～ 22,000	200 × 2	50	11. 0 kg
800	624. 0	10,400	20,000 ～ 30,000	150 × 4	50 × 2	12. 5 kg
1,000	780. 0	13,000	25,000 ～ 35,000	200 × 4	50 × 2	15. 5 kg

【How to use】

① Placing the proper CALFA "BAS" quantities (Dosage), calculate a total amount of circulation water (Flow Rates), and make sure the quality & density values of supplying water such as PH, Conductivity, Total Hardness, Ca Hardness, State of ionized Silica etc. The matchabe example as follow m3/h or L/m matchable to 20 ppm (0.002%).
Ex.100m3/h ×0.002% =2Kgs. Particularly when the supplying water with poor quality, coordination must be made before use of special suitable system.

② Choose good locations for placing CALFA "BAS" in the cooling towers and tighten with plastic wire for more stabilizes at where the maximum exposure to the water and smooth circulation is maintained. (Recommend Location: 0.4m/sec. water flow) In case of necessary to use more replacing CALFA "BAS", separate several locations of placement, when the total holding water is abundant (meaning much of BAS) It will enhance BAS's efficacy.

③ For the first time to use of CALFA "BAS", within 1 to 2 months after CALFA "BAS" was placed, scale & rust and alike which accumulated inside the system will be removed and dissolved into the circulation water, then settle inside the sump pit, be sure to remove (clean) with Cleaning Cooling Towers in humanly.

④ Recommend to control the specific conductivity of the water "under 1,000μS/cm"

⑤ Thereafter, a good and stable condition of the water can be maintained for about 6 months (The case of cooling systems are operating for 10-12 hours per day). After 6 months, please a brand new package of CALFA "BAS", then the same good condition can be maintained in succession.

⑥ Recommend to install a strainer in front of Heat Exchanger to catch removed debris of scale if the tubes are very narrow, or "Plate Type" of Heat Exchangers case.

⑦ Recommend to use a CALFA "SAT" (Bactericide) together for controlling the number of bacteria, algae if you suffer from terrible Bacteria or algae.

CALFA BAS

~ Evaluation Method ~

The performance of CALFA “BAS” effects can be adequately evaluated in accordance with the “LTD” (Leave Temp. Difference).

The traditional methods evaluation was based on the analysis of the water. However, in our case, the effect of “BAS” can be measured and confirmed by observing the variation of the thermal conversion rate and the pressure in the condenser, while enabling to check the decrease of scale.

The CALFA “BAS”management chart (“Karte”) system will be helpful for keeping records of related date, thereby results of the “BAS”effects can be eventually known to you.

1. The temperature of the cooling water:
   To confirm the difference of the temperature of the cooling water at the entrance and the exit of the condenser (ΔT).
2. The pressure in the condenser:
   By monitoring changes in the pressure in the condenser, the effect can be confirmed.

In 30 to 40 days after the placement of “BAS”, scale and rust, which had accumulated inside the pipeline, will dissolve, fall down, and mix into the circulating water. Therefore, the water will temporarily become muddy and dirty. It is one of the phenomenon of the presentation of the “BAS”effects. The dirty water must be refreshed by blowdown. Once this stage is over, you can only implement regular blowdown. (Conductivity control).

Without mentioning, you can also manage this phenomenon by systematically measuring the “LTD” (Leave Temp. Difference)



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