

Greenex™ CSD



Controlling water quality in cooling systems



Common Problems With Water Within Cooling Systems

Corrosion

Capacity to transfer heat is reduced
Equipments may be corroded causing leakage Equipments and parts may be damaged and blockage may occur in piping systems

Scale Deposit

The system does not run effectively
Corrosion occurs under scale layer

Bio-Fouling and Sludge Accumulation

Corrosion occurs under sludge layer
Accumulation leads to unclean system



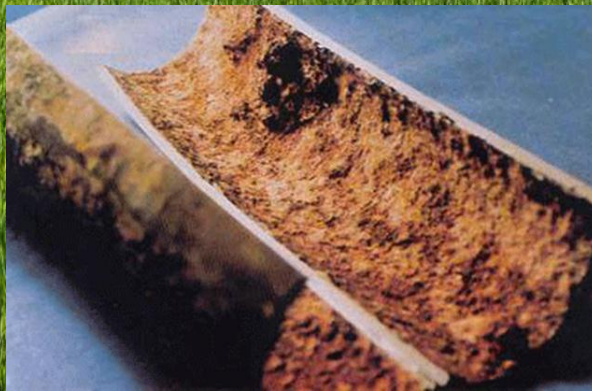
Scale Deposit

Scale deposition is a natural occurrence caused by the precipitation of mineral constituents dissolved in the water.

It mostly occurs when temperature fluctuates.

Most scale are calcium carbonate, which is less soluble in water.

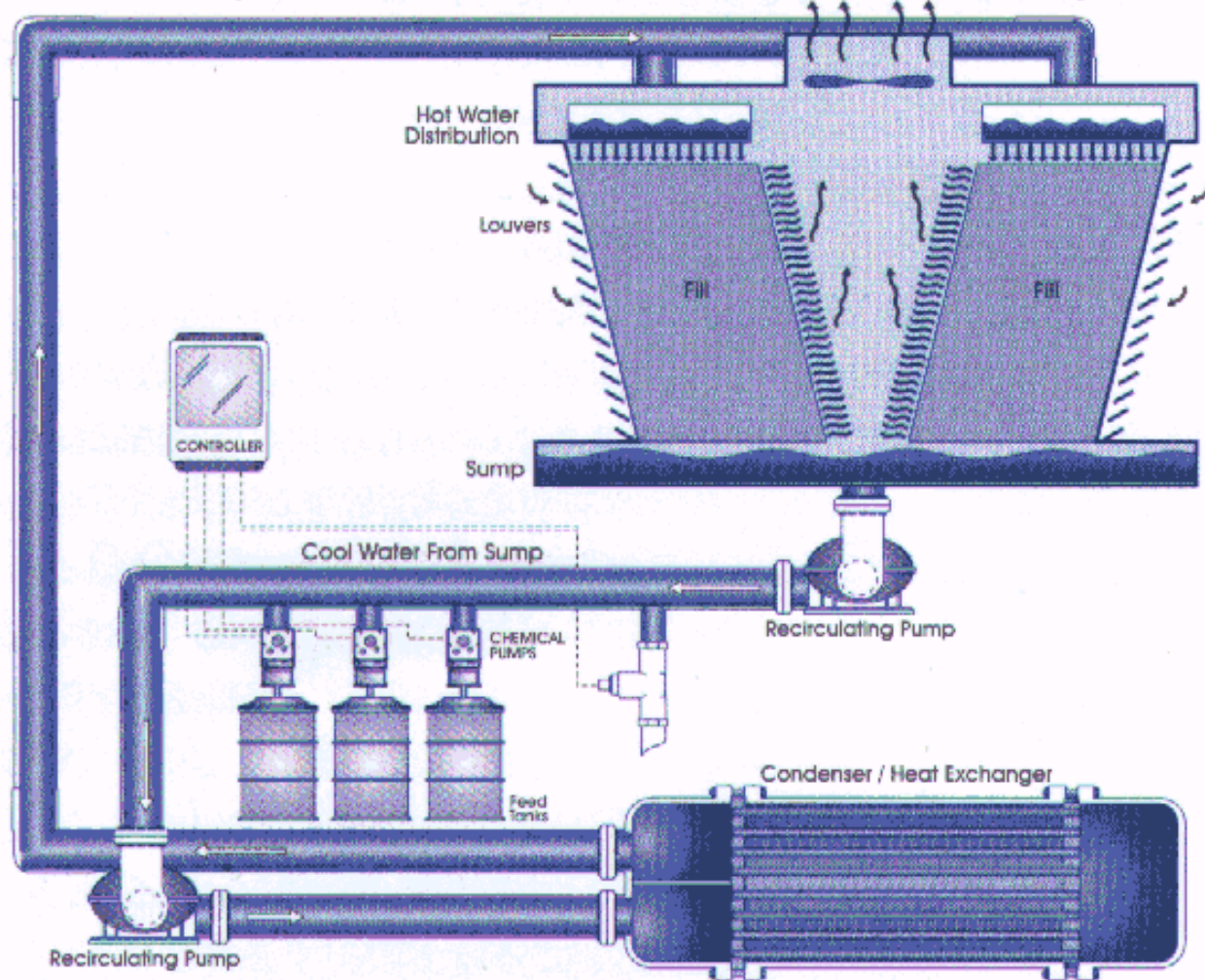
Other deposition such as magnesium carbonate, calcium-magnesium sulfate and calcium-magnesium bicarbonate may also be found.



Most Problem of Cooling Water Systems is Scale

Cooling Tower • Heating Flow Schematic

Mechanically induced Draft



Bio-Fouling and Sludge Accumulation

Bio-fouling is caused by the growth and reproduction of bacteria and other micro organism.

The condition of cooling water within the cooling system is suitable for such growth which happen on the system's inner walls contributes to a problem of bio-fouling and sludge accumulation.



An innovation for cooling system

Greenex™ CSD : Cooling System Detox

1

plant extract active ingredients

2

biodegradability

3

Save energy, money, water, and time

4

Convenient with high efficiency



An innovation for cooling system

Greenex™ CSD : Cooling System Detox

1. Effective scale inhibition

4. Simplifies system cleaning and maintenance process

2. Eliminates discharged water (water is reusable)

5. Reduces energy consumption and operating cost

3. Does not require water softener

6. Safe to users, equipment's and parts in the system



Features

1. Dissolves old scale and prevent new scale formation

2. Loosen old deposited scale

3. Enhances the system heat exchanging capacity

4. Inhibits scale deposition

5. Prevents bio-film formation

6. Reduces the amount of dirty particle from attaching to inner walls



Functions

1 Dissolves old scale and prevent new scale formation

2 Loosen old deposited scale

3 Enhances the system heat exchanging capacity

4 Inhibits scale deposition





PRINCIPLES OF SCALE FORMATION & SOLVING WITH GREENEX™ CSD

Scale is a natural phenomenon caused by the crystallization of ionized mineral dissolved in water, which may be classified into 2 groups according to their polar nature:

Cation particles which are positively charged including:
Calcium (Ca^{2+})
Magnesium (Mg^{2+})



Anion particles which are negatively charged including:
Chloride (Cl^-)
Sulfate (SO_4^{2-})
Carbonate (CO_3^{2-})
Bicarbonate (HCO_3^-)



These dissolved mineral particles as they contain different charges, have a tendency to attract each other, for example:

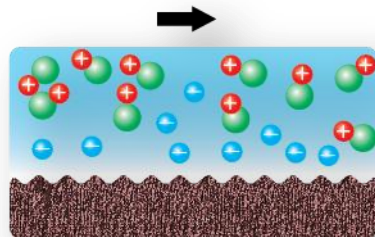
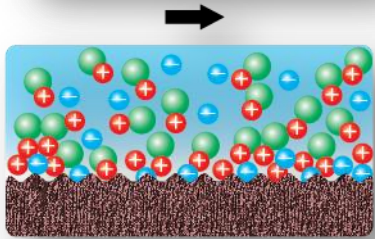
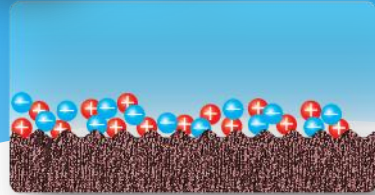
- Calcium/Magnesium Carbonate
- Calcium/Magnesium Bicarbonate
- Calcium/ Magnesium Sulfate
- Calcium/ Magnesium Chloride

These dissolved mineral are a major and difficult problem in cooling systems. They may form hard scale on the walls within the system, especially where temperature changes may occur, such as the heat exchanging units.

Solving Scale Problem with Greenex™ CSD

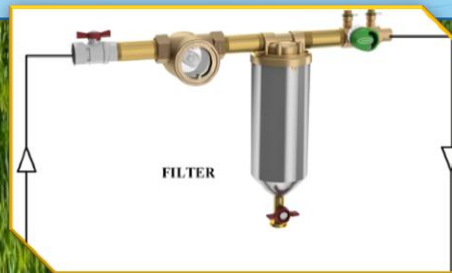


The principles in solving the problem of scale formation by using Greenex products are based on controlling the scale formation by keeping the dissolved mineral suspended in solution. By binding with the cation particles, the 2 ionic particles are kept in separation and dissolved. As the result, scaling will less likely occur. Also the products have the ability to dissolve old scale by utilizing organic acids, scale that had already formed within the system will soften and may be cleaned or flushed off easily.



Applications

- Add the product at the ratio of 500 ppm or 500 ml. : 1 m³.
(1,000 Liter) of water in the system / week (0.5 L/Cu.m/week)
- Side Stream Filters may be implemented to recycle discharged water.
- If required an application of biocide, the product may be use together without any lost in effectiveness.



Benefits

- **Safe energy and water consumption**
- **Safe time and money**
- **Cost of maintenance is constant**
- **Cleaner system and safer for users**
- **Does not react with metal, nylon, and plastic parts within the system**
- **Environmentally friendly**

BIODEGRADABILITY OF GREENEX™ PRODUCTS

GREENEX-NF(for non –ferrous mental cleaner)
 GREENEX-FC(for ferrous mental cleaner)
 GREENEX-CSD (Cooling System detox)

82%
 91%
 91%

DEPARTMENT OF SCIENCE SERVICE
 BANGKOK 10000, THAILAND

No. 0306/ 1855
 Saphumwan Co Ltd,
 403 Moo 3 Soi Thasak 22,
 Phrasaeng Rd.,
 Mueang Luchai 13000

February 2005

Dear Sirs,

With reference to your request of 12 January 2005, Ref. No. 284 we are pleased to send you the following report on the sample of "E14 ALL PURPOSE CLEANER" received on 12 January 2005.

Yours truly,
 (Sgt.) Sukkoth T Saengchanta
 (Mr. Sukkoth T Saengchanta)
 Director, Chemistry Program

Chemistry Program
 Tel. 0 2201 7227-6

Sender's Sample Designation	Marking	Laboratory No.	Biodegradability Percentage
E14 ALL PURPOSE CLEANER	-	XS-001	82

(Sgt.) Khamsath Thasakthamcharoen
 (Mr. Khamsath Thasakthamcharoen)
 Scientist 5

Chiefed true translation
 (Sgt.) Chuladee Sunthaphol
 Unit, Department Sub-Division

The above report is valid for the received sample only. The report does not guarantee any such material of the same brand or marking which may be sold in the market. THIS REPORT IS NOT TO BE USED FOR ADVERTISING PURPOSES.

DEPARTMENT OF SCIENCE SERVICE
 BANGKOK 10000, THAILAND

No. 0306/ 1654
 Saphumwan Co Ltd,
 403 Moo 3 Soi Thasak 22,
 Phrasaeng Rd.,
 Mueang Luchai 13000

February 2005

Dear Sirs,

With reference to your request of 12 January 2005, Ref. No. 285 we are pleased to send you the following report on the sample of "E12 METAL DEGREASER" received on 12 January 2005.

Yours truly,
 (Sgt.) Sukkoth T Saengchanta
 (Mr. Sukkoth T Saengchanta)
 Director, Chemistry Program

Chemistry Program
 Tel. 0 2201 7227-6

Sender's Sample Designation	Marking	Laboratory No.	Biodegradability Percentage
E12 METAL DEGREASER	-	XS-001	88

(Sgt.) Khamsath Thasakthamcharoen
 (Mr. Khamsath Thasakthamcharoen)
 Scientist 5

Chiefed true translation
 (Sgt.) Chuladee Sunthaphol
 Unit, Department Sub-Division

The above report is valid for the received sample only. The report does not guarantee any such material of the same brand or marking which may be sold in the market. THIS REPORT IS NOT TO BE USED FOR ADVERTISING PURPOSES.

DEPARTMENT OF SCIENCE SERVICE
 BANGKOK 10000, THAILAND

No. 0306/ 4201
 SAPHUMWAN CO., LTD.,
 403 Moo 3 Soi Thasak 22,
 Phrasaeng Rd.,
 Mueang Luchai 13000

25 March 2005

Dear Sirs,

With reference to your request of 8 March 2005, Ref. No. 1717 we are pleased to send you the following report on the sample of "D-SGALER" received on 8 March 2005.

Yours truly,
 (Sgt.) Sukkoth T Saengchanta
 (Mr. Sukkoth T Saengchanta)
 Director, Chemistry Program

Chemistry Program
 Tel. 0 2201 7227-6

Sender's Sample Designation	Marking	Laboratory No.	Biodegradability percentage
D-SGALER	E1-03	XS-310	97

(Sgt.) Nongrutal Saengseengroeng
 (Mr. Nongrutal Saengseengroeng)
 Scientist 5

Chiefed true translation
 (Sgt.) Chuladee Sunthaphol
 Unit, Department Sub-Division

The above report is valid for the received sample only. The report does not guarantee any such material of the same brand or marking which may be sold in the market. THIS REPORT IS NOT TO BE USED FOR ADVERTISING PURPOSES.

Products

No.	Products	Properties	Dosage
1	Greenex CSD	3 in 1 Cooling System Detox	500 ppm/cu.m/week
2	Greenex CSD-CL	3 in 1 Cooling System Detox for Close Loop	500 ppm/cu.m/3 months
3	Greenex R&S F1	Rust and Scale Remover from cooling system	2-10% by volume, circulation 2-24 hours.
4	Greenex Algaecide	Algaecide for cooling system	1L :2000-8000L.

Greenex Dosing Pump

Feature & Benefits

Automatic and easy to use for transferring a precise volume of liquid or chemicals in a specified time period providing an accurate flow rate. With the use of timer the pump can start working automatically without any user and time for the pump to work each time can also be set to give a precise volume of liquid.



1. Display the frequency
2. Adjust the stroke length
3. Increase the frequency
4. Reduce the frequency
5. Open/Close
6. Power Connection

Timer



1. Display the time
2. Adjust the time for the pump to work each time
3. Unit of time for the pump to work each time
4. Adjust time period for the pump to start working
5. Unit of time for the pump to start working

Specification

Specification	
Stroke Length	20-100 %
Stroke Frequency	0-100 %
Flow	1.0 L/H
Pressure	10 Bar
Voltage	220 V
Power	28 W
Ambient Temp	-10°C ~ 45°C
Pump Material	PVC

Monitoring Lab Report




Metal Working Fluids Analysis for Predictive Maintenance & Full Efficiency

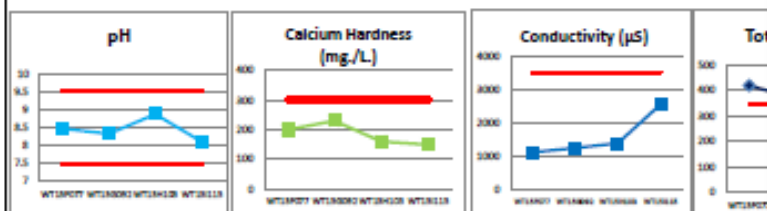


Sample Information:

Report Number.:	WT151115		
Company :	Kasal Teck See CO., LTD.		
Address :	150/59 Pinthong Industrial Estate 2 Moo 9 T.Nongkham, A.Sriracha Chonburi Province 20230		
Contact Person :	K.Noppol		
Sample Name :	Greener CSD		
Machine :	Cooling Tower	Manufacturing :	Automotive
Date Sample :	23/9/2015	System Age :	May 14 15 months
Date Received :	23/9/2015		

Analysis Report:

Test Criteria	Test Method	Unit	Specification	Test Reported		
				WT15F077 4/6/2015	WT15G092 10/7/2015	WT15H103 19/8/2015
Appearance	Observation					
Temperature IN	Thermometer	°C	-	30	31.9	-
Temperature OUT	Thermometer	°C	-	27	30.2	-
GAP of Temp.	Cal.	°C	-	3	1.7	-
pH	pH Meter	-	6.5-8.5	8.47	8.32	8.87
Conductivity	Conductivity Meter	µS	< 3,500	1,120	1,250	1,390
Total Dissolve Solids	Electrometric	mg./L.	< 1,500	754	674	735
Total Hardness	EDTA-Titrimetric	mg./L.as CaCO ₃	< 350	420	370	252
Calcium Hardness	EDTA-Titrimetric	mg./L.as CaCO ₃	< 300	200	230	160







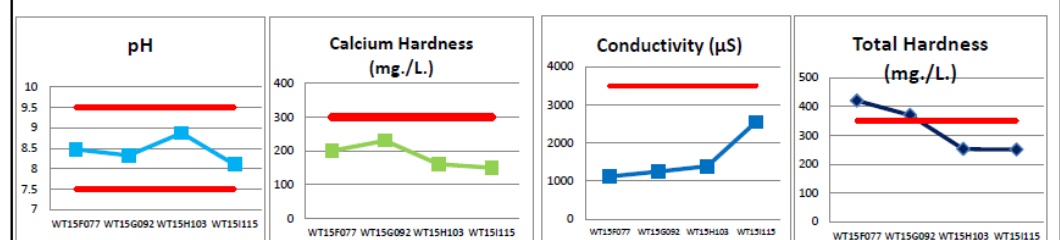
Suggestion and Recommendation:

WT15I115	Water in specification.
WT15H103	Water in specification.
WT15G092	Total Hardness above spec. drain water out and refill new water.
WT15F077	Total Hardness above spec. drain water out and refill new water.
Laboratory Signature:	K.Tawichat
Date :	2 Oct 15
Approved Code :	BAA

Date Received : 23/9/2015

Analysis Report:

Test Criteria	Test Method	Unit	Specification	Test Reported			
				WT15F077 4/6/2015	WT15G092 10/7/2015	WT15H103 19/8/2015	WT15I115 23/9/2015
Appearance	Observation						
Temperature IN	Thermometer	°C	-	30	31.9	-	-
Temperature OUT	Thermometer	°C	-	27	30.2	-	-
GAP of Temp.	Cal.	°C	-	3	1.7	-	-
pH	pH Meter	-	6.5-8.5	8.47	8.32	8.87	8.1
Conductivity	Conductivity Meter	µS	< 3,500	1,120	1,250	1,390	2,550
Total Dissolve Solids	Electrometric	mg./L.	< 1,500	754	674	735	1330
Total Hardness	EDTA-Titrimetric	mg./L.as CaCO ₃	< 350	420	370	252	250
Calcium Hardness	EDTA-Titrimetric	mg./L.as CaCO ₃	< 300	200	230	160	150



Siam Kubota

- * Greenex R&S F1 >>> Cleaning cooling pipe line
- * Greenex CSD >>> Cooling Tower Treatment



Survey Form

1. What kind of factory?
2. Gap Temp (In-Out)?
3. Quantity of water in system (Liters)?
4. Water supply quality (sample)?
5. What chemical supply in system?
6. Any problem in system? (scale, rust, algae, gap temp, electric consump, etc.)



Question ?



Greenex™ CSD

Thank You For Your Time!

