



# INTRODUCTION FOR REDOX REACTOR

Our redox reactor is eco-friendly products made from special alloy materials.

The REDOX acts a sterilization, odor removal, scale prevention, rust protection, non-degradable organic compounds treatment, TP-TN treatment etc. without any secondary pollution.

2018. 08



# REDOX REACTOR

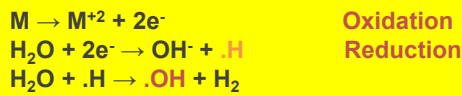


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## What is REDOX REACTOR ?

REDOX reactor is a special metal alloy material, a fine-art technology that gives the effects of sterilization, odor reduction, scale elimination, heavy metal elimination and rust elimination through the reaction against fluids, and is an eco-friendly product that does not cause any secondary pollution.

## REDOX REACTION



When fluid is flowed in REDOX REACTOR, electron's current occurs by reaction processor. This process makes electric potential over 600~800 mV. This energy acts as energy of electrochemistry reaction and play the role of such as below.

### - Sterilization

The principle of sterilization is as below.

1. Sterilization by the hermolysis of cell membrane caused by the ion exchange with the cell of microbe.
2. Sterilization by the electrochemical response by REDOX reaction.
3. The electric potential made by the process of redox reaction. In this case, the electron generated remains in fluid and sterilize bacteria additionally. therefore the efficiency of sterilization is very high. Especially, it takes excellent effect in sterilization of mold, fungi, algae, moss and virus.

### - Stink elimination

The cause of odor is fundamentally eliminated, decomposing odor elements by the electrochemical reaction.

### - Preventing scale

The scale ion of calcium (Ca<sup>2+</sup>), magnesium (Mg<sup>2+</sup>) are crystalized in fluid, then it is impossible to stick in pipe wall.

### - Anti-rusting

The steel pipe have to extract electron to be rusted, but sufficient electron is supplied in the process of redox reaction in fluid. therefore, the steel pipe can not be rusted.

### - Improving surfactant

The surfactant is soluble in water over critical micelle concentration level by redox reaction, so cleaning power is up.

### - Reducing non-degradable organic matters

The organic matters is divided by hydroxyl Radical at β-chain according Beta fission theory. Then it is easy to treat with chemical or other way.

### - Eliminating total phosphorus

Replace coagulant based aluminium by coprecipitation theory.

### - eliminating heavy metal ion

### - eliminating residual chlorine

### - eliminating residual insecticides and so on.

## Fields of application

Fields	Functions
<b>For water treatment</b>	
Boiler, heat exchanger, cooling tower etc.	Preventing algae, sterilization, preventing scale & rust
Fountain, pond etc.	Preventing algae, sterilization
Laundry, shower, bidet etc.	Sterilization, water softening
Bathhouse, swimming pool	Preventing algae, sterilization
Washing vegetable or fruit	sterilization, removing residual insecticides
Purification plant, water tank	Sterilization, reducing T-P/T-N, removing heavy metal etc.
Protection of RO membrane	Sterilization, removing residual chlorine
<b>For metal processing oil</b>	
For water soluble	Sterilization, oder reduction, improving emulsification
<b>For environmental fields</b>	
For wastewater treatment	Reducing non-degradable organic matters, TP_TN, etc.

## REDOX REACTOR SPECIFICATION

MODEL	DIMENSION (mm)			ALLOWABLE FLOWRATE (ℓ/min)
	L	ID	OD	
RXF-10	250	30	65	20/30 ( heavy/light duty )
RXF-20	500	30	65	40/60 ( heavy/light duty )
RXF-30	750	30	65	60/90 ( heavy/light duty )

Heavy duty: waste water      Light duty: clean water



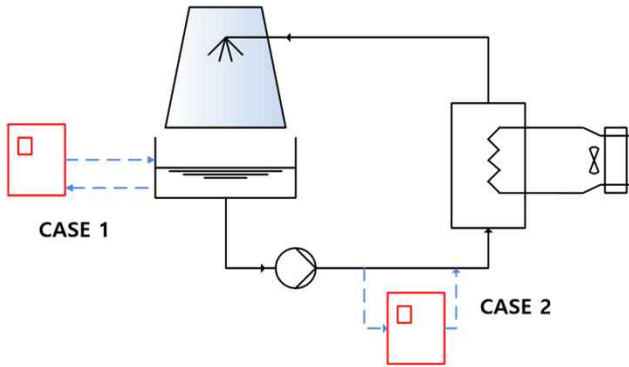
**Non-chemical  
Water treatment**



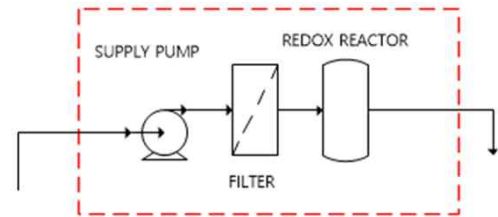
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## Cooling Tower Water Conditioner

### INSTALLATION



### COMPOSITION



Redox reactor is eco-friendly products made from special alloy materials. The REDOX acts sterilization, odor removal, scale prevention, rust protection , reducing non-biodegradable organics , removing total phosphorus density etc. without any secondary pollution.



PROBLEMS IN COOLING WATER SYSTEM		Effect of REDOX
phenomenon	problems	
Scale adhesion	Making energy loss by low heat dissipation effect	Protecting scale adhesion
rusting	Pipe clogging and reducing service life of pipe	Resisting rust
Occurring algae, moss and slime	Pipe and valve s clogging	Prevention clogging of pipe and valves
Occurring legionella and bacteria	Harmful in human body	Improving health environment

# Natural Sterilizing Water softener



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## What is natural sterilizing water softener?

Natural sterilizing water softener is made from a special alloy material. The hydroxyl radical (OH radical) is formed in the process of oxidation and reduction reaction process. The hydroxyl radical is involved in almost all pollutants and sterilization, disinfection. Pollutants can be removed by chemical decomposition. It is the most powerful effect, but a harmless natural substance in the human body. When you take a shower, it is effective to disinfect and sterilize bacteria on skin and improve skin and prevent skin infections.

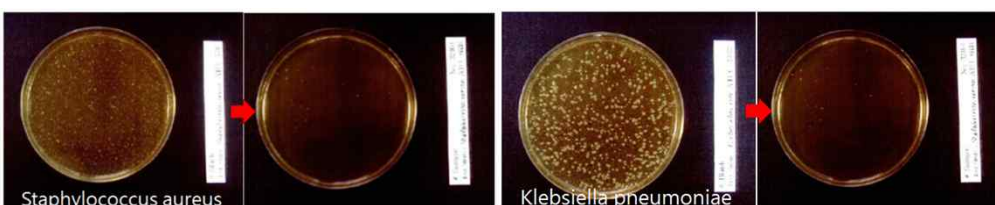
## Instllation method



※ Unscrew the existing connections of shower and connect the natural sterilizing water softener. Connect the shower hose on the opposite side of natural Sterilizing water softener as shown above.

## Effect of natural sterilizing water softener

- Sterilizing bacteria and fungi inhabiting in the skin
- Removing waste on skin
- Well cremated by softening skin
- Anti-aging and whitening effect.
- Prevent the scarring caused by acne
- Smoothing hair and preventing hair cracking
- Preventing dandruff
- Preventing atopic dermatitis
- Protecting the skin from bacterial diseases



## Certificate



## INFORMATION

※ The service life of the product is about two years. However, it may be subject to be changed depending on the conditions of raw water and pipe fouling conditions.

# MPO Conditioner

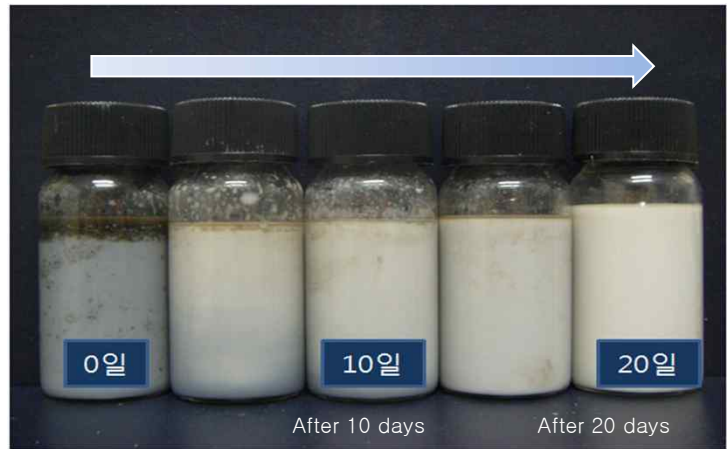


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## Features ;

- Kills bacteria and mold
- Eliminate rancidness
- Lengthen coolant service life
- Lengthen tools service life
- Prevent skin rashes
- Improve part finish
- Improve working conditions



items	status		
	original	After 10 days	After 20 days
appearance	gray	Light gray	white
pH	8.7	9	9
density(%)	3	3	3
Bacteria (cfu/ml)	$1.0 \times 10^6$	$1.0 \times 10^2$	$1.0 \times 10^1$
Mold (cfu/ml)	$<1.0 \times 10^1$	3	ND
Stink level	140	15	10

## PRODUCTS and PRICE

DIVISION	CAPACITY	MODEL	PRICE(FOB)	specification
For metal Processing oil	Below 500 liter	CRO-500	2,800usd/set	With oil skimmer, redox reactor, pump & case
	Below 1000 liter	CRO-1000	3,450usd/set	
	Over 1000 liter is manufactured by order			

# Waste water Treatment system



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## POSCO-KWANGYANG



- Capacity : 200m<sup>3</sup>/day
- Period : 2010. 11 ~ 2011. 10
- Application : rolling oil wastewater

## POSCO-INDIA

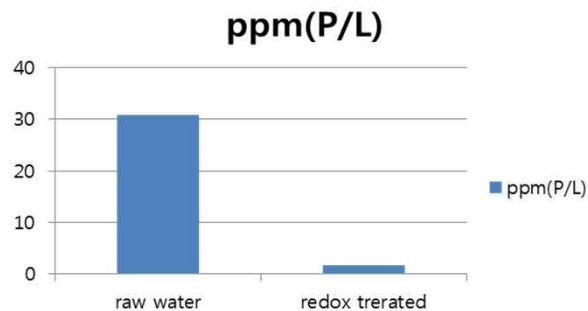


- Capacity : 200m<sup>3</sup>/day
- Period : 2012. 1 ~ 2013. 12
- Application : rolling oil wastewater

Division	SS (mg/L)	COD (mg/L)	n-Hexane (mg/L)	Remark
Inflow	5,790	2,328	11,189	Tested by POSCO chemical test Sect.
Treated	39	349	16	
Efficiency	99.3%	85.0%	99.8%	

## phosphorus reduction in waste water

Division	ppm(P/L)
raw water	30.912
redox treated	1.728



### Application in the field of ;

- T-N, T-P control
- Phosphorus control
- COD/BOD control
- Phenol , organic matters control

# REDOX applications

Water treatment			
Field		Purpose	
☞	<b>Thermo-hygrostat</b>	scale	
☞	<b>Boiler</b>	Scale, rust prevention	
☞	<b>humidifier</b>	scale	
☞	<b>Heat exchanger</b>	scale	
☞	<b>Cooling tower</b>	Scale, fungus, sterilization	
☞	<b>Cold water for welding machine</b>	scale	
☞	<b>Cooling water for modling</b>	Scale, fungus	
☞	<b>Water reservoir (golf course)</b>	Fungus, algae	
☞	<b>Fountain</b>	Algae, sterilization	
☞	<b>Waste water</b>	COD/BOD Organic matters	
☞	<b>Diluent for coolant</b>	Scale( soft water)	
☞	<b>RO membrane</b>	Residual chlorine sterilization	
☞	<b>Washing machine</b>	sterilization	
☞	<b>Denist sterilized water</b>	sterilization	
☞	<b>Sterilized clean water</b>	Sterilization( restaurant, hospital)	
☞	<b>Bath water treatment</b>	Sterilization, soft water	
☞	<b>pasteurization</b>	sterilization	
☞	<b>Apartment water treatment</b>	Sterilization, rust prevention and soft water	
☞	<b>Emergency water supply</b>	sterilization	
☞	<b>Swimming pool</b>	sterilization	
☞	<b>Aquarium</b>	Sterilization, algae	
☞	<b>drinking water supplying system</b>	Sterilization, algae	
☞	<b>Sea water</b>	sterilization Red tide	
☞	<b>Ballast water</b>	sterilization	
☞	<b>Special bath for atopy therapy</b>	Sterilization Soft water	
☞	<b>Fruit, vegetable washing</b>	Reducing Pesticide residue	

## Water based oil treatment

### Putrefaction prevention and stink elimination

- ☞ **Metal processing oil purification**
- ☞ **SPM wet oil purification**
- ☞ **Metal working fluids purification**
- ☞ **Metal parts washing oil purification**
- ☞ **Other water soluble oil purification**

## Other field

### Environmental improvement

- ☞ **Residual chlorine removal**
- ☞ **Phenol removal**
- ☞ **Organic matters removal**
- ☞ **Non-degradable COD treatment**
- ☞ **T-P, T-N, NH<sub>4</sub><sup>+</sup> treatment**