

SR - Scale Remover

For Cooling Water Treatment
Without Chemicals



The problem

- Due to evaporation, concentration of salts in the cooling tower water increases constantly.
- This is the main reason for the deposition and scaling on cooling tower's elements and inside the CW pipes.
- Cooling tower's scaling causes a diminution of the efficiency of the cooling tower's efficiency.
- Cooling tower's scaling is a natural habitat of legionella bacteria.





Conventional CW treatment

- Mainly by means of addition of chemicals or by water softening.
- Both inhibit scale deposition but have disadvantages:
 - high operating and maintenance costs
 - large quantities of cooling tower's water bleeding.
 - Soft water are very corrosive and damage the cooling tower's metal parts and CW pipes.
 - Both of them are not environment friendly process.



Our Solution is the SR

In order to overcome the disadvantages of conventional cooling water treatment we have developed a totally new concept in this field: The Scale Remover, based on electrolysis process.



Our Solution the scale remover SR

The main advantages of the SR are:

- The electrolysis scale remover replaces and eliminates chemical water treatment.
- The electrolysis scale remover SR fight bio life and alga by the power of chlorine produced next to its anode.
- The electrolysis scale remover SR collect all free calcium carbonate and magnesium carbonate from the water and prevents any scale deposits on the cooling tower elements
- The electrolysis scale remover **SR reduces water bleeding and total water consumption to 2/3 of conventional consumption.**





- The electrolysis scale remover **SR** is controlled by a microprocessor based PLC and its valves are electrically activated .
- The electrolysis scale remover **SR** is ecologically safe and environmentally friendly.
- The electrolysis scale remover **SR extend** the cooling tower life.



The Device

Cathode

Control Panel



Titanium anode

Enclosure

Circulating Pump

Basis



The power supply

- Wide range, stabilized electronic power supply.

Input: 230/115VAC

Output: 24VDC – 0-20Amp



The Enclosure

- Electrolytic chamber made carbon steel, coated by backed epoxy.



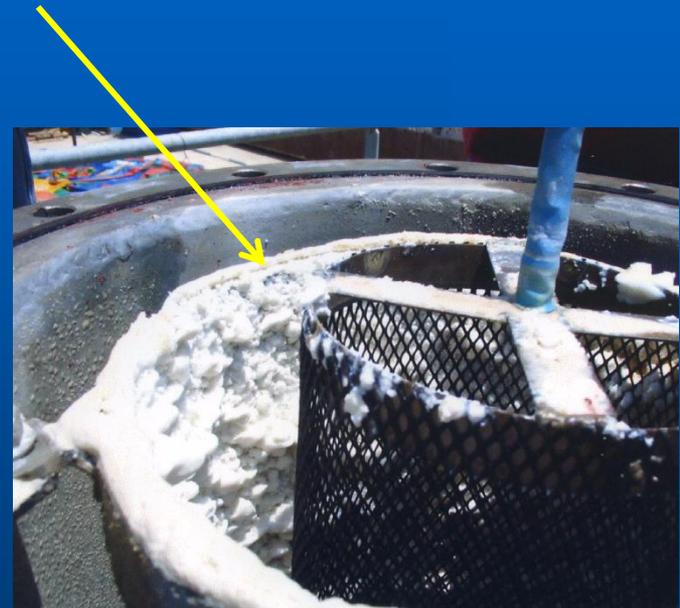
The Anode

- Made of titanium mesh with MMO coating.
- Has an operating life of 8-10 years.



The cathode

- Made of stainless steel.
- Does not release iron ions into the water.
- Electrically isolated from the enclosure

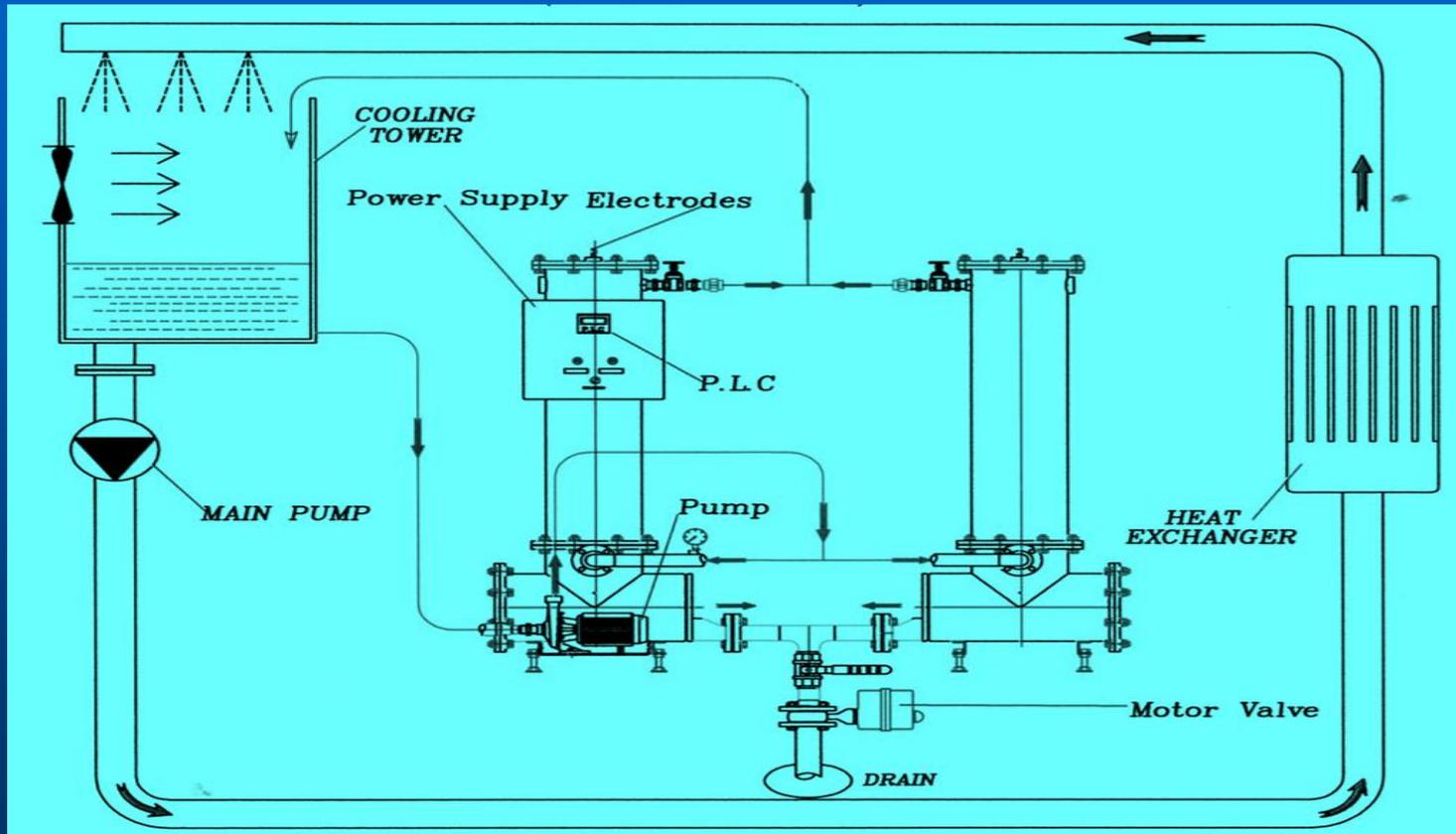


Operation Process

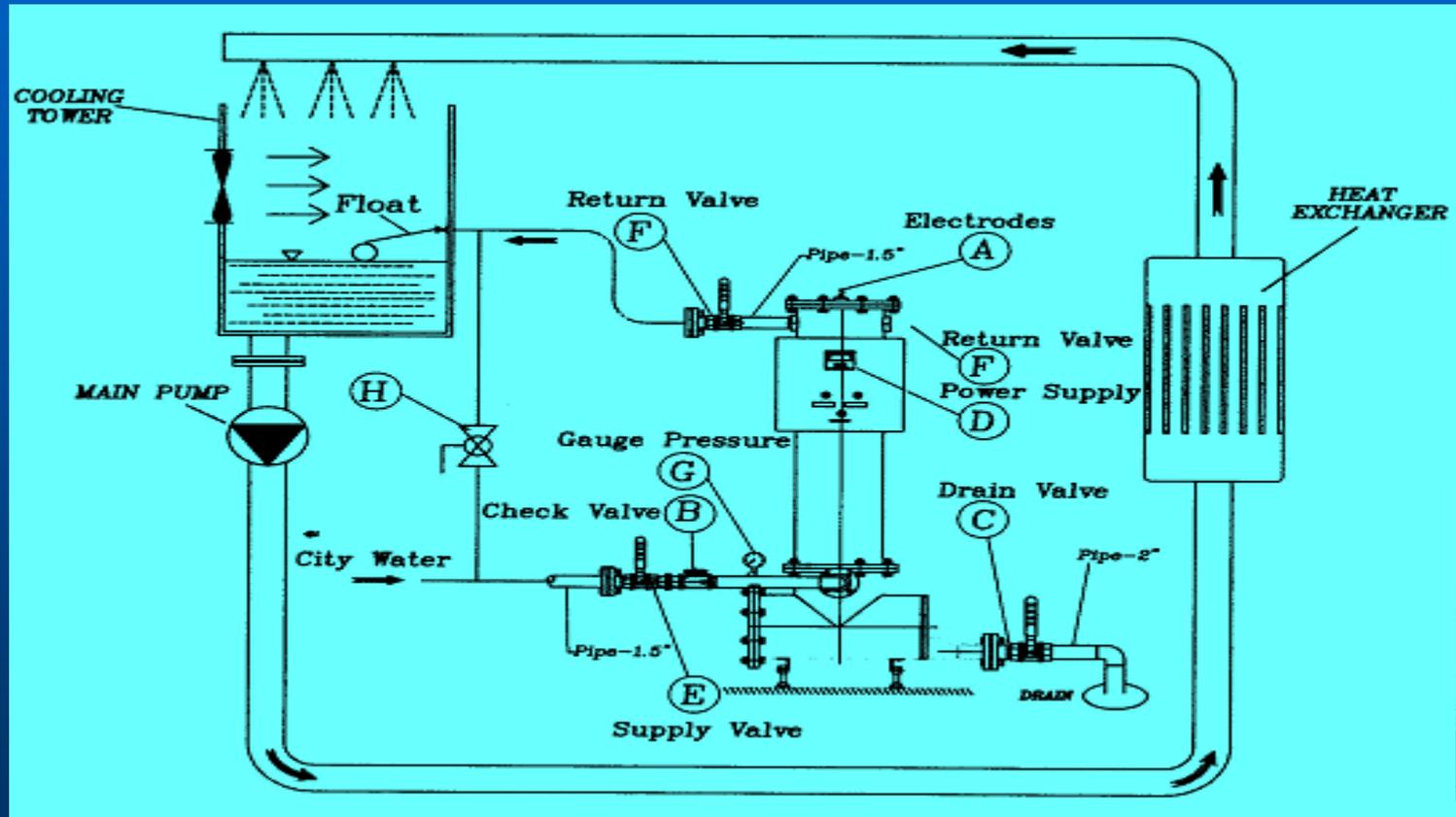
- Both the cooling water and or the make-up water are continuously circulated through the device.
- The Scale Remover installed is in a side stream, independently out of the Heat Exchanger's CW circuit.
- The SR process activated (full automatic system) when the *SR* connected to power and water flow through it..
- The Scale Remover could be operated manually as well for maintenance and check-up purposes.



Scale remover model SR-10 Installation drawing



Scale remover model SR-05 Installed on make-up drawing



3 x BR-05 installed at an Israeli shopping center



SR-10 installed at an Israeli shopping center



The chemistry of the process

- By applying electrical power between the anode and the cathode, a chemical reaction is activated and electrolysis process takes place. Water from the cooling tower pond is circulated through the electrolysis scale remover SR
- Due to the electrolysis process, the floating calcium molecules are deposited on the cathode and the water is returned to the cooling tower free of calcium.

- The chemical reaction on SR cathode is as follows:



The chemistry of the process

- The electro-chemical process counteracts the cooling tower water concentration due to evaporation and to intake of dust and gases from the surrounding air.
- On the cathode surface a high pH and alkaline environment, is created . This alkaline environment causes the settling of hydroxides and minerals of low solubility, enhancing formation of less soluble carbonate and hydroxides.
- The anode, made of catalytic metal, frees electrons from its surface and thus, oxygen and carbon dioxide gas is evolved, producing disinfecting conditions which act against the growth of microorganisms.



Water quality report

Water Quality Report

Site/Client: Holom Shopping Center
 Person on in charge : Nisan Ben Yosef

Sampling Date. 27/11/2007
 Laboratory water analyzing date 28/11/2007

Sample Source	Measuring Unit	Cooling Tower Make up water	Cooling Tower #1	Cooling Tower #2	Cooling Tower #3	Optimum Standard
Conductivity	μS/cm	840	1660	2750	2060	2800 - 3200
Ph		7	7.6	7	7.7	7.8 - 8.2
Ca Hardness - CaCO ₃	ppm	144.48	206.4	223.6	147.92	<250
Total Hardness - CaCO ₃	ppm	275.2	378.4	498.8	412.8	
Alkalinity M.O - CaCO ₃	ppm	189.2	206.4	232.2	137.6	70-140
Chloride - Cl	ppm	100	375	550	450	600-650
Appearance						
Nco			2.0	3.3	2.5	2.7 - 3.0
Nca			1.4	1.5	1.0	1.3 - 1.6
Ncl			3.8	5.5	4.5	2.7 - 3.0
LSI 8 [46°F (7.8°C)]	Langlier Index		0.18	-0.27	0.13	0.1 - 0.3
LSI 8 [100°F (37.8°C)]			0.76	0.31	0.71	0.8 - 1.0
LSI 8 [160°F (71°C)]			1.34	0.89	1.29	1.2 - 1.4



Technical data

- The scale remover is manufactured in following models:

Model	Max.Flowrate Cu.m/hour	Cooling tower capacity TR
<i>SR-05</i>	5	200
<i>SR -10</i>	10	400
<i>SR-15</i>	20	600
<i>SR-20</i>	25	1000



Technical data

- The SR power consumption is about 2 kWh depending on model.
- Working current – 10 up to 20 Amp.
- Economy in water consumption – 25...30%



Technical data

- Preparations by Customer for installation of SR:
 - Outlet and inlet piping to tower $d=1.5''-2''$
 - 2'' piping to sewage
 - Power supply 220/115V 20Amp
- Dimensions of the device:
 - Area: 600X500 mm (for the SR-05 unit)
 - Height 1400 mm

