SCALE-OFF
NON CHEMICAL ONLINE WATER SCALE PREVENTERS
Water Management Through Physics, Not Chemistry

WELDON ENGINEERS (INDIA)
Manufacturer of POLO make FRP Cooling Towers & Non-Chemical On Line Scale Preventers
SCALE-OFF
NON CHEMICAL ONLINE
SCALE PREVENTION SYSTEM

Weldon Engineers India is a Delhi based company with over 15 years experience manufacturing and supplying successful non-chemical water treatment devices around the world. SCALE-OFF is a leading scale prevention range designed for use in industrial applications catering for equipment protection to large pipe-line scale prevention.

All SCALE-OFF Device is certified and approved by many Govt. authorities.

SCALE-OFF operates totally non-chemically, does not add anything to the water and is even approved safe for use in drinking water systems.

SCALE-OFF requires no power, no maintenance and can be installed in remote locations, in gravity feed systems and will constantly treat water without the need for backwashing.

SCALE-OFF Device is widely used around the world offering a range of non-chemical treatment to industries like Steel Plant, Power Plants, Cold Storage, Sugar Industries, HVAC and many more..........
SCALE-OFF
TYPICAL APPLICATIONS:

Below are some examples of systems treated by Scale-off:

- Heat Exchangers
- Injection Molding Machines
- Air Conditioning Systems
- Vacuum Pumps
- Condensers
- Water Heaters
- General Cooling Circuits
- Cooling Towers
- Mixing Valves
- Sea Water Cooling Circuits
- Refrigeration Systems

Distillaries

Before Scale-off

HVAC Plant

After Scale-off

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INSTALLATION EXAMPLES

Installation at NBCC AC Plant, New Delhi

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INSTALLATION EXAMPLES CONTINUED

Hot water / low pressure steam for heating

Reverse Osmosis / Ultra filtration

A Revolution In Scale Solution "Scaleoff"
## SCALE-OFF AND CONVENTIONAL TREATMENTS COMPARED

Scale-off scale preventers compared to conventional softening and chemical systems

<table>
<thead>
<tr>
<th></th>
<th>SCALE-OFF</th>
<th>Conventional chemical system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>Simple – 1 or 2 persons</td>
<td>Complicated – professional stuff</td>
</tr>
<tr>
<td>Investment</td>
<td>One time</td>
<td>On-going running costs</td>
</tr>
<tr>
<td>Energy consumption</td>
<td>None</td>
<td>Consume</td>
</tr>
<tr>
<td>Chemicals</td>
<td>None</td>
<td>Consume</td>
</tr>
<tr>
<td>Storage for chemicals</td>
<td>None</td>
<td>Required</td>
</tr>
<tr>
<td>Spare parts</td>
<td>None</td>
<td>Required</td>
</tr>
<tr>
<td>Waste water</td>
<td>None</td>
<td>Daily</td>
</tr>
<tr>
<td>Environmental pollution</td>
<td>None</td>
<td>Creates</td>
</tr>
<tr>
<td>Maintenances</td>
<td>None</td>
<td>Daily</td>
</tr>
<tr>
<td>Guarantee</td>
<td>5 years</td>
<td>1 or 2 years</td>
</tr>
<tr>
<td>Handle variable water quality</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Average Life</td>
<td>15 + years</td>
<td>10 to 15 years</td>
</tr>
</tbody>
</table>
Selection Guidance:

Peak and average flow rates should be considered when selecting the correct Scale Off for a system. Once the flow has been determined the "Product Selection Guidance Chart" shown below will provide assistance in selecting the diameter suited to the application.

The goal is to determine and select the minimum diameter unit that can be used without incurring unacceptable pressure losses at peak demand periods.

Product Selection Guidance Chart:

.actual maximum water flow according to system pressure.
## Tentative Water saving and Payback Calculations For 300 TR Plant

<table>
<thead>
<tr>
<th>Plant Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity in Tr.</td>
<td>300</td>
</tr>
<tr>
<td>Flow of Re-Circulating in m³/Hr.</td>
<td>300</td>
</tr>
</tbody>
</table>

### Before Scale off:

<table>
<thead>
<tr>
<th>COC Maintained</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaporation @0.7 % of circulation rate</td>
<td>[A]</td>
<td>1.9 m³/hr</td>
</tr>
<tr>
<td>Blow Down = [Evp / COC-1]</td>
<td>[B]</td>
<td>0.18 m³/hr</td>
</tr>
<tr>
<td>Total consumption [A+B] per Hour</td>
<td>[C]</td>
<td>2.08 m³/hr</td>
</tr>
<tr>
<td>Total consumption per Day=C x 8 as make up to cooling tower</td>
<td>[D]</td>
<td>16.64 m³/day</td>
</tr>
</tbody>
</table>

### After Scaleoff:

<table>
<thead>
<tr>
<th>COC Maintained</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaporation @0.8 % of circulation rate</td>
<td>[A1]</td>
</tr>
<tr>
<td>Blow Down = [Evp / COC-1]</td>
<td>[B1]</td>
</tr>
<tr>
<td>Total consumption [A1+B1] per Hour</td>
<td>[D1]</td>
</tr>
<tr>
<td>Total consumption per Day=D1 x 16</td>
<td>[E1]</td>
</tr>
<tr>
<td><strong>Total Savings of Water = [D - E1]</strong></td>
<td>[I]</td>
</tr>
<tr>
<td><strong>Total Savings of Water per year = [I] x 350 days</strong></td>
<td>[J]</td>
</tr>
</tbody>
</table>

### Total Savings after E Scale off Installation

Saving due to less consumption of water and stopping softner operation and descaler chemicals

### Cost Calculations

<table>
<thead>
<tr>
<th>Cost Item</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Saved Water = [J] x Rs. 28/-</td>
<td>[K] 1,47,490.00 Rs. Per Year</td>
</tr>
<tr>
<td>Cost of Chlorine chemicals saved</td>
<td>[L] Rs. Per Year</td>
</tr>
<tr>
<td>Cost saved due to elimination of plant shut down for Heat Exchanger cleaning</td>
<td>[M] Rs. Per Year</td>
</tr>
<tr>
<td><strong>Direct Saving per Year = [K+L+M]</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL SAVING</strong></td>
<td>Rs. Per Year</td>
</tr>
</tbody>
</table>

**PAY BACK PERIOD WITH ONLY WATER SAVING Rs. 1,47,490/- in 2-3 YEARS**

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*A Revolution In Scale Solution "Scaleoff"*
# Selection Table

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Length</th>
<th>Diameter</th>
<th>Flowrange</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS-1A</td>
<td>12&quot;</td>
<td>1&quot;</td>
<td>50 – 80 LPM</td>
</tr>
<tr>
<td>WS-2B</td>
<td>24&quot;</td>
<td>1.5&quot;</td>
<td>120 – 200 LPM</td>
</tr>
<tr>
<td>WS-3C</td>
<td>24&quot;</td>
<td>2&quot;</td>
<td>200 – 310 LPM</td>
</tr>
<tr>
<td>WS-4D</td>
<td>36&quot;</td>
<td>2.5&quot;</td>
<td>310 – 440 LPM</td>
</tr>
<tr>
<td>WS-5E</td>
<td>36&quot;</td>
<td>3&quot;</td>
<td>440 – 750 LPM</td>
</tr>
<tr>
<td>WS-6F</td>
<td>36&quot;</td>
<td>4&quot;</td>
<td>750 – 1800 LPM</td>
</tr>
<tr>
<td>WS-7G</td>
<td>36&quot;</td>
<td>5&quot;</td>
<td>1800 – 2400 LPM</td>
</tr>
<tr>
<td>WS-8H</td>
<td>36&quot;</td>
<td>6&quot;</td>
<td>2400 – 4200 LPM</td>
</tr>
<tr>
<td>WS-9I</td>
<td>36&quot;</td>
<td>8&quot;</td>
<td>4200 – 7000 LPM</td>
</tr>
<tr>
<td>WS-10J</td>
<td>36&quot;</td>
<td>10&quot;</td>
<td>7000 – 10000 LPM</td>
</tr>
<tr>
<td>WS-11K</td>
<td>36&quot;</td>
<td>12&quot;</td>
<td>10000 – 14000 LPM</td>
</tr>
<tr>
<td>WS-12L</td>
<td>36&quot;</td>
<td>14&quot;</td>
<td>14000 – 19000 LPM</td>
</tr>
<tr>
<td>WS-13M</td>
<td>36&quot;</td>
<td>16&quot;</td>
<td>19000 – 25000 LPM</td>
</tr>
<tr>
<td>WS-14N</td>
<td>36&quot;</td>
<td>18&quot;</td>
<td>25000 – 32000 LPM</td>
</tr>
<tr>
<td>WS-15O</td>
<td>36&quot;</td>
<td>20&quot;</td>
<td>32000 – 40000 LPM</td>
</tr>
<tr>
<td>WS-16P</td>
<td>36&quot;</td>
<td>22&quot;</td>
<td>40000 – 48000 LPM</td>
</tr>
<tr>
<td>WS-17Q</td>
<td>36&quot;</td>
<td>24&quot;</td>
<td>48000 – 57000 LPM</td>
</tr>
<tr>
<td>WS-18R</td>
<td>36&quot;</td>
<td>26&quot;</td>
<td>57000 – 67000 LPM</td>
</tr>
<tr>
<td>WS-19S</td>
<td>36&quot;</td>
<td>28&quot;</td>
<td>67000 – 78000 LPM</td>
</tr>
<tr>
<td>WS-20T</td>
<td>36&quot;</td>
<td>30&quot;</td>
<td>78000 – 89000 LPM</td>
</tr>
</tbody>
</table>

LARGER SIZES AVAILABLE ON REQUEST

*A Revolution In Scale Solution "Scaleoff"*
Pressure Drop Graphs

2-1/2"

3"

4"

5"

6"

8"

10"

12"

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Scaling and its causes

Water is a very good solvent for minerals and many other materials. All of the ionic species try to keep in a thermodynamic equilibrium with their environment, and they achieve this by combining together in clusters - perhaps growing to form crystals - or by breaking up into free ions. All of these reactions are occurring all the time as local conditions change.

Forming part of the ions calcium and carbonate, and they can form calcium carbonate - the principle scaling salt found in hard waters. We need to understand the equilibrium of these species in water, and in doing so we will know whether scaling can occur, or not. If we can, in some way, change the equilibrium with ScaleOff, we can modify the scaling behaviour of hard water.

The equilibrium solubility product for calcium carbonate is a thermodynamically defined value for a given pressure and temperature. It is the concentrations of calcium and carbonate free ions in equilibrium with a large crystal of calcium carbonate suspended in water. Equation (1) is the standard way of showing this equilibrium.

Equation 1: \[ \text{[Ca}^{++} \text{][CO}_3^-] \rightarrow \text{[CaCO}_3] \]

It is this equilibrium point that all waters will try and reach either by crystal growth or dissolution. At this equilibrium point, the crystal will be growing and dissolving at the same rate.

Most waters will be at equilibrium if given time, but changes in the environment, such as bore-well water emerging to the surface or the temperature and pressure changes that take place in heat-exchange plants will disturb this equilibrium. This leads to changes of the water composition. If the concentration of calcium and carbonate is greater than the equilibrium requirements, then the water attempts to reduce these concentrations and it does this by precipitation and growth of scale crystals. Equally, the water may be under saturated with respect to calcium carbonate, and this will increase the free ion concentrations by dissolving scale crystals.

The term super saturation ratio (Sr) is used as a shorthand description of the equation that determines whether the water can scale:

\[ \text{Sr} = \frac{[\text{Ca}^{++}]a [\text{CO}_3^-]a}{[\text{Ca}^{++}]\text{eqm} [\text{CO}_3^-]\text{eqm}} \]

The square brackets refer to the ion concentrations (mole/litre) of the free calcium and free carbonate, the 'a' refers to actual concentrations prevalent in the water, and 'eqm' to the equilibrium concentrations as defined above.

If Sr > 1, scaling can occur; if Sr < 1, scaling cannot occur but dissolution can.

This is a fundamental, thermodynamic requirement for scale formation or dissolution. From it we can see that scaling is controlled by the equilibrium concentrations of Ca++ and CO3- ions, defined by pressure and temperature and by the actual free ion concentrations of these in any water.

All of these control factors can be modified to some degree for a given water and heat exchange plant. The one that is most readily, and economically, variable is the CO3- - ion concentration. Each reaction and ionic species demands its own equilibrium concentration. If the temperature is increased, the bicarbonate ion thermally decomposes forming carbonate.

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thereby increasing the super saturation ratio and providing the conditions for scale formation. It is this reaction that causes the scaling of hot surfaces - whether the surface is a kettle element or a large heat exchanger. If the pH level increases, the water tries to produce free H+ ions so as to achieve the H+/OH equilibrium for H2O. One of the easiest ways it can do this is to decompose carbonic acid, and bicarbonate the ion - again producing carbonate ions and increasing the super saturation ratio.

Fig 1a. The alkalinity equilibrium chain

Fig 1b. Increased temperature and pH effects

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Increasing pH has a much greater effect on Sr than an increase in temperature, as illustrated in Fig 1b.

A temperature change of 80 degrees C takes a water that is close to saturated at 10 degrees C to a supersaturation ratio of between 3 and 4. This will be enough to cause severe scaling. But a change of one pH unit, from 7 to 8 increases Sr to around 15. Scaling is around 5 times as rapid - or five times as likely to occur - than under the temperature increase shown above.

pH levels and temperature are the factors that most affect the CO3 concentration, and in turn affect Sr and consequently scale formation; pH is the most dominant.

Can we then use these factors to propose, and demonstrate, a feasible explanation for the SCALEOFF water treatment? The answer is yes.

**Water Treatment**

The SCALEOFF unit ( Figs 2 and 3 ), never more than 1m long, is plumbed into the system it is meant to protect. The standard unit is an apparently simple device; water is made to flow past a special alloy insert in a length of pipe.

If the unit is to work, it must change the water as it flows past. It must, in some way, reduce the supersaturation ratio of the water, i.e. the free Ca++ and free CO3-- ions must be reduced. The most obvious way would be by precipitating them as calcium carbonate - much like lime softening techniques.

Because of the composition of the unit, there are only two ways in which it can work. First, the special alloy could either adsorb ions from the solution or corrode. Either event could increase the pH locally, increase the Sr locally, and cause precipitation of calcium carbonate, thus providing the desired result that downstream of the SCALEOFF the water is part-softened and carries suspended calcium carbonate crystals. Secondly, the shape of the unit promotes turbulence; the associated pressure differences could cause dissolution of CO2 gas which may get stripped from the water when it becomes open to the atmosphere, in a cooling pump for example, and therefore reduce the total carbonic species in the water.

The second method is independent of alloy composition, but copper or zinc inserts, for example, do not work in practice. We are therefore drawn to the first, the special alloy, effect mechanism.

**HOW DOES SCALEOFF PREVENT SCALING IN YOUR EQUIPMENT?**

The working principle of SCALEOFF is very simple and proven. It incorporates use of the Galvanic Principle, Chemical Characteristics of water and Fluid Dynamics. SCALEOFF exploits solubility characteristics of Calcium and Magnesium salts in water with change in its pH value. SCALEOFF locally increases the pH value of water before it reaches high temperature zone and then precipitates out the hardness causing salts in the form of colloids as water flows through SCALEOFF.

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As water passes through **SCALEOFF**, the whole core inside gets negatively charged, since water itself acts as an electrolyte within the equipment. This negatively charged core attracts H+ from water, which are the lightest ions. The relationship between pH of water and H+ is expressed by the formula pH+ = 1/H+. Thus with the H+ becoming less and less, pH value of water increases, thereby precipitating hardness causing Calcium and Magnesium salts.

There could be a doubt in mind regarding formation of scales within **SCALEOFF** itself and that the equipment itself might get chocked after sometime. However, this is not the case since the shape of core is trapezoidal, which creates turbulence in the water, and the scale particles being very small, the flow of water carries away these colloidal particles with it and the equipment remains completely clean forever.

As with any other equipment, **SCALEOFF** too has its optimal operating range, within which it performs best. Ideally, the pH value of water should not exceed 8.0 in recirculation and the minimum flow rate as is applicable for various pipe sizes should be strictly maintained. Minimum and Maximum flow rates corresponding to various pipe sizes.

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SAVINGS & BENEFITS

a) IMPROVEMENT IN THE PLANT LOAD FACTOR (PLF):- **SCALEOFF** gives guaranteed zero scale in condenser and other coolers resulting in constantly maintained efficiency of the heat exchangers thus helps in improvement of PLF. Due to its unique ability to precipitate scale forming salts into very fine particles of colloidal nature, **SCALEOFF** does not allow the deposition of these salts in heat transfer area. Moreover the precipitated salts get re-dissolve in water/fluid as soon as they reach the zero velocity zone in cooling tower basin, thus keeping the complete cooling tower circuit scale free.

b) REMOVAL OF EXISTING SCALE: - Due to the reduction of the free Calcium and Magnesium from solution by the formation of their Carbonate crystals and the solubility being constant, water/fluid can dissolve more salts, which it tends to pick up from the existing scale in the system, thereby desalting scaled up systems. However, it is not marketed as a scale remover, but as a scale preventer.

c) REDUCING WATER CONSUMPTION & WATER WASTAGE: - **SCALEOFF** has been tested successfully to operate at very high level of hardness (10000ppm). This unique ability of **SCALEOFF** gives freedom to use RO Reject & ETP treated water in Cooling tower as make up water and allows it to increase cooling tower COC above 20, thus reducing blow down quantity almost equivalent to drift and windage loses. This can make a very unique, practical & most economical zero discharge condition.

d) PREVENT WATER POLLUTION: - With the reduction in blow down & consumption of effluents like RO Reject & ETP treated water in cooling tower as make up water **SCALEOFF** provides a great help in minimizing surface water pollution. Further, elimination of dosing of chemicals like anti-scalant and stopping use of Softener, **SCALEOFF** offers great help in reducing the water pollution.

e) ZERO RECURRING & MAINTENANCE EXPENSES: - **SCALEOFF** does not have any operating & maintenance expenses thus is a “fit & forget system”. Due to special design of the core, **SCALEOFF** creates heavy turbulence in water/fluid flowing through it, which makes it a self cleaning & maintenance free equipment. Further since **SCALEOFF** does not incorporate any moving part and any external energy source, it is a totally maintenance free Equipment.

f) NO CHANGE IN CHEMICAL COMPOSITION OF WATER: - **SCALEOFF** does not change the chemical composition of water, but instead, changes the nature of the scaling salts from a dissolved state to a suspended state, thereby preventing scale build up.

g) NO RISK OF CORROSION: - Water softeners necessitate use of corrosion inhibitors, as soft water tends to be corrosive. Similarly, chemical dosing reduces the pH of water, thereby increasing the risk of corrosion. **SCALEOFF** on the other hand has the unique advantage of preventing scale deposition without increasing the risk of corrosion.

h) NO INVESTMENT RISK: - **SCALEOFF** is sold with a 5 years Performance Guarantee. In view of this, there is no investment risk on part of the user of the equipment. It also offers a low pay back period, depending upon the type of industry and present means of water/fluid treatment.

A Revolution In Scale Solution "Scaleoff"
OPERATING GUIDELINES FOR SCALEOFF:

- pH value of the re-circulating cooling water should be maintained between 7.0 to 8.5 for optimal results of SCALEOFF.
- There should not be any Zero velocity zone between SCALEOFF and heat Exchanger/Condensers to be protected.
- There should not be any valve or strainer between SCALEOFF and Heat Exchanger/Condensers.
- Cooling tower sump should be cleaned for any sludge/debris etc. before start of operation.
- Side Stream filter should be operated regularly with open top back wash regularly.
- pH should be maintained by dosing pH maintaining Chemicals or by commercial grade $\text{H}_2\text{SO}_4$. The Quantity of Sulphuric Acid ($\text{H}_2\text{SO}_4$) dosing can be finalized on commencement of the operation as it is dependent on the Sump holding capacity, quality of water, pH of makeup water, flow rate, evaporation and drift losses etc.
- Continue with anti corrosive treatment & Bio fouling prevention treatment as per requirement

PERFORMANCE TEST AFTER SCALEOFF INSTALLATION

Analysis of test result

<table>
<thead>
<tr>
<th>CHLORIDE TEST FOR SCALING CONFIRMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE OF TEST</td>
</tr>
<tr>
<td>Total Chloride</td>
</tr>
<tr>
<td>Total hardness</td>
</tr>
</tbody>
</table>

Analysis of test result

If

- $C_2 / C_1 = H_2 / H_1 \pm 10\%$  
  SAFE, SYSTEM NOT SCALING
- $C_2 / C_1 < H_2 / H_1$  
  UNSAFE, SYSTEM IS SCALING
- $C_2 / C_1 < H_2 / H_1$  
  SYSTEM IS DE-SCALING

A Revolution In Scale Solution "Scaleoff"
POWER PLANT

**SCALE OFF** can be very gainfully installed in condensing type thermal power plants. Typically, a 1000 MW power plant would require approximately 38000 M³ of water per day, much of which is wasted resulting in higher operating costs for the plant. **SCALE OFF** offers a huge saving potential by way of:

- Saving this precious water.
- Improving the Plant Load Factor (PLF) by optimizing condenser vacuum thus resulting in higher power generation with better efficiency.
- Reducing the plant down time required for condenser cleaning.

As one might expect, with millions of liters of circulating (cooling) water flowing through the condenser tubes, anything that is contained within the water and flowing through the tubes, can ultimately end up either on the condenser tube-sheet or within the tube itself. Tube side fouling for surface condensers is caused mainly due to SCALING, which are crystalline forms of Calcium and Magnesium salts.

Depending on the extent of this fouling, the impact can be quite severe on the condenser's ability to condense exhaust steam coming from the turbine. As fouling builds up within the tubing, an insulating effect is created and the heat transfer characteristics of the tubes are diminished requiring the turbine to be slowed to a point where the condenser can handle the exhaust steam produced. Typically, this can be quite costly to power plants in the form of reduced output, increased fuel consumption and increased CO₂ emissions. This “de-rating” of the turbine to accommodate the condenser's fouled or blocked tubing is an indication that the plant needs to clean the tubing in order to regain the turbine’s rated capacity.

**EFFECT OF EXHAUST PRESSURE/ VACUUM IN POWER PLANT:**

Higher exhaust pressure i.e. lower vacuum, increases the steam consumption in the turbine, keeping all other operating parameters constant. Exhaust pressure lower than that specified, will reduce the steam consumption and improve the turbine efficiency. Similarly exhaust vacuum lower than that specified, will lower the turbine efficiency and increase the steam consumption.

Figures below represent the effects of exhaust vacuum on steam consumption and turbine efficiency respectively, keeping all other factors constant for the condensing type turbine.

![Graphs showing effect of exhaust vacuum on steam consumption and turbine efficiency](image)

These figures also indicate that an improvement in exhaust vacuum by 0.014 Kg/cm², reduces the steam consumption in the turbine by about 1.1% and improves in turbine efficiency significantly from 0.24% to 0.4%.

**Our Installation:**

- NHPC
- GAIL
- RELIANCE
- BHEL
- & many more....
DISTILLERY PLANT

SCHEMATIC DIAGRAM TO CONSUME CONDENSATE / SPENT LEES IN DISTILLERY & CO-GEN PLANT COOLING TOWER TO ACHIEVE ZERO LIQUID DISCHARGE WITHOUT CPU (ZLD WITH SCALEOFF )

Advantages of using SCALE OFF are listed below:

- Condensate (Sugar & Distillery) / Spent lees can be directly used in cooling tower as makeup water without treating it further in C.P.U. (Condensate Polishing Unit).
- Direct use of RO Reject & Raw Water in CT [Cooling Tower] as make up water.
- Cooling tower will be operated at higher COC of 15-20 resulting in almost NIL blow down.
- Reduced blow down and use of effluent quality water will reduce water Consumption thus reduced water wastage & reduced water pollution.
- Higher COC & Use of effluent quality water in cooling tower as makeup water will lead to reduced load to MEE or use of MEE can be eliminated.
- No need to use Soft water & anti-scalant chemicals in cooling tower.
- Permanent relief from formation of Hard water scaling in tubes of Condensers & other heat exchangers.
- Due to scale free condition in condenser; recovery and quality of spirit/ENA is improved.
- Increase in overall production from Distillery Unit because of better recovery of spirit/ENA and as no shutdown of the plant is required for de-scaling of condenser.
- No mechanical or chemical de-scaling required for condenser & other coolers; leading to improved plant and machinery life.
- SCALE OFF has zero operating and maintenance expenses (no electrical power and no spares) and hence is a truly FIT & FORGET equipment.

Our Installation:

IndianOil

& many more......
AIR CONDITIONING PLANT

Total elimination of hard water Scale in the cooling system of Refrigeration plant by installation of our SCALE OFF Equipment.

Our Equipment SCALE OFF has been established in the market to give the following savings in Refrigeration plant / cooling tower operation.
- Zero Scale in condensers.
- Optimum Head Pressure maintained in Refrigeration plant.

SCALE OFF Equipment is an online equipment which is fitted just before water cooled condensers/ Heat Exchangers.

A brief description given below, will easily establish the benefits that can be achieved by installing SCALE OFF:
- Anti-scaling chemicals are not required in cooling water.
- Descaling of heat exchangers is not required.
- No Softening plant is required.
- No shutdown of plant is required for cleaning of condenser / heat exchanger’s tubes, In conventional water treatment system shut down of plant is required frequently to clean the tubes Chemically / Mechanically, as the case may be.
- Cost of manpower, Chemicals and Loss of production for a large number of days due to shutdown is saved every year.
- Due to repeated cleaning of the hard scales in tubes with rod & acid, the tube surface becomes weak and prone to leakages. Any leak in condenser/cooler causes shutdown of plant and adds cost of replacing tubes.
- Head pressure in Refrigeration plant remains maintained which gives Considerable savings of electricity.
- Due to scale free system, optimum approach is maintained thus plant runs at optimum efficiency.

Our Installation:

& many more......