





**CASE**

**WELCOMES YOU ALL TO**

**PRESENTATION on Scale Ban**

**Scale Ban-A Non Chemical Water**

**Treatment Equipment**



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# Scale-Ban a fit and forget System

SCALE - BAN

A NON-CHEMICAL WATER TREATMENT EQUIPMENT





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# Scale - Ban

The Scale-Ban is a 1-meter long pipeline, which is installed online. It is a non-chemical water treatment equipment. Once installed it stops the formation of scale in your heat exchange zones completely .





# What Causes Scale



- The main hardness causing salts are that of **Mg** and **Ca**. The more they are in the water the more the scale formation takes place.
- Alkalinity is directly proportional to scale formation. The more the alkalinity the more the scale formation.
- pH of water is also directly proportional to scale formation. With the increase in the pH, the solubility of **Ca** and **Mg** salts present in the water decreases and their precipitation takes place, thus forming scale.
- With the increase in temperature, the solubility of the **Ca** and **Mg** salts decreased and they form scale.
- If there is high concentration of total dissolved solids (TDS) in the water the property of water to dissolve the **Ca** and **Mg** salts is affected, resulting in scale formation on the heat exchange zone.

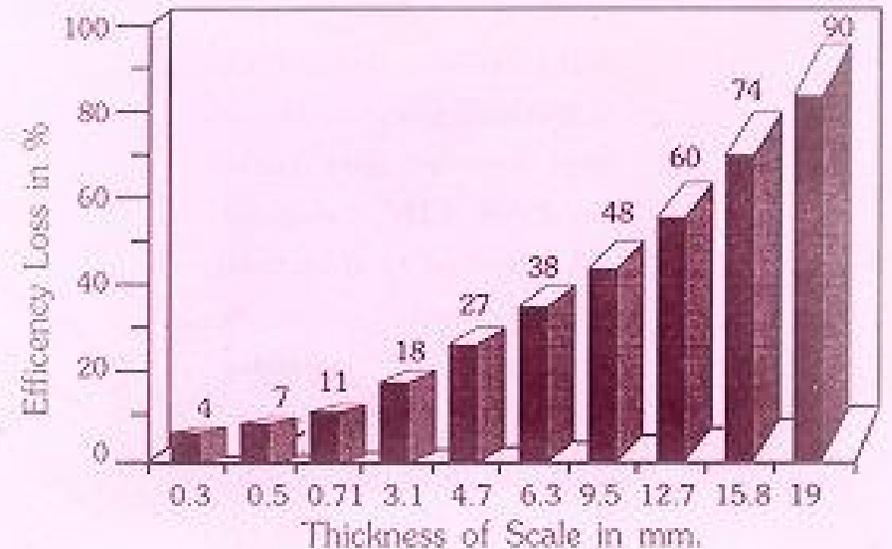


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# Effects of Scale

- The graph tells us how dangerous scale can be to the heat exchangers. Clearly, you can see that a scale deposit of 0.5 mm can give you a 7% efficiency loss while scale of 3.1 mm gives you an efficiency loss of 18%.





# Devastating Effects of Scale

- The presence of scale can affect the heat transfer process. Scale being a bad conductor of heat does not allow the heat transfer to take place effectively.
- Due to the inefficient heat transfer there is a loss in production and optimum usage is not achieved.
- There is an increase in down time.
- Scale forming has to be removed regularly and this process takes a lot of time and energy, thus increasing the maintenance cost of the machine.



# Water Treatment Method's

- There are various methods, which have been used to treat water and the various methods are:
- Water softening treatment: this is the most widely and commonly used method.
- Chemical treatment: this method has various drawbacks but it is still used
- Non-chemical treatment: People are mainly unaware about this kind of a treatment as it is new and is suffering an unawareness trauma. Today people understand the use and application of this equipment and are readily installing it in their circuits. Countries like Germany, Japan, Switzerland are totally dependent on this equipment for scale prevention.



# Scale Ban

## Treatment

- Scale-Ban is the latest technique and is a breakthrough in preventing the formation of scale.
- Once Scale-Ban is installed, it requires no maintenance and no kind of energy is required.
- Results in zero production down time.
- Since Scale-Ban is itself, a scale preventor so there is no question of Scale-Ban being deteriorated in the course of time.

## Principle

- The principle is very simple. It is based on the galvanic principle. When you insert a zinc and copper rod in a beaker containing sulphuric acid, electron flows from the zinc rod towards the copper rod and the zinc rod gets devoid of electrons. This happens because the zinc rod is much more Electro positive than the copper rod. This principle is used in the Scale-Ban.

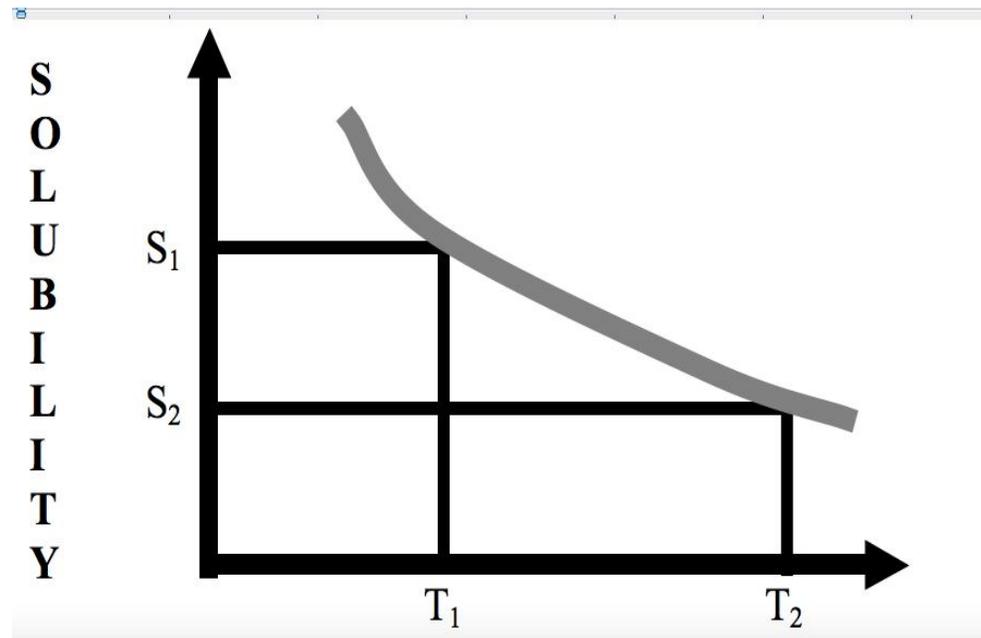


# Formation of Scale



## Temperature

- Looking at the graph, we first see how scale actually takes place. When there is an increase in temperature, owing to the unusual property of calcium and magnesium salts, instead of increase in solubility, their solubility decreases. From a common experience we have seen that when we keep on adding sugar to water we reach a point of saturation, if we wish to add more sugar to the water we heat the water and little bit of more sugar can be dissolved. It is due to this peculiar property that scale is formed. So from the graph we can see that when temperature increases from  $T_1$  to  $T_2$  there is a solubility drop from  $S_1$  to  $S_2$ . Due to this the calcium and magnesium salts in the water remain insoluble and settle themselves at the most convenient place that in this case happens to be the heat exchange zone.





# What do we do to prevent this

- Our technology aims to prevent the formation of scale. That is to say, we convert the precipitates of calcium and magnesium into the size of less than  $0.5\mu$  in the Scale-Ban. By this the salts remain in the water in the form of suspended colloidal particles and are washed away by the turbulent flow of water.

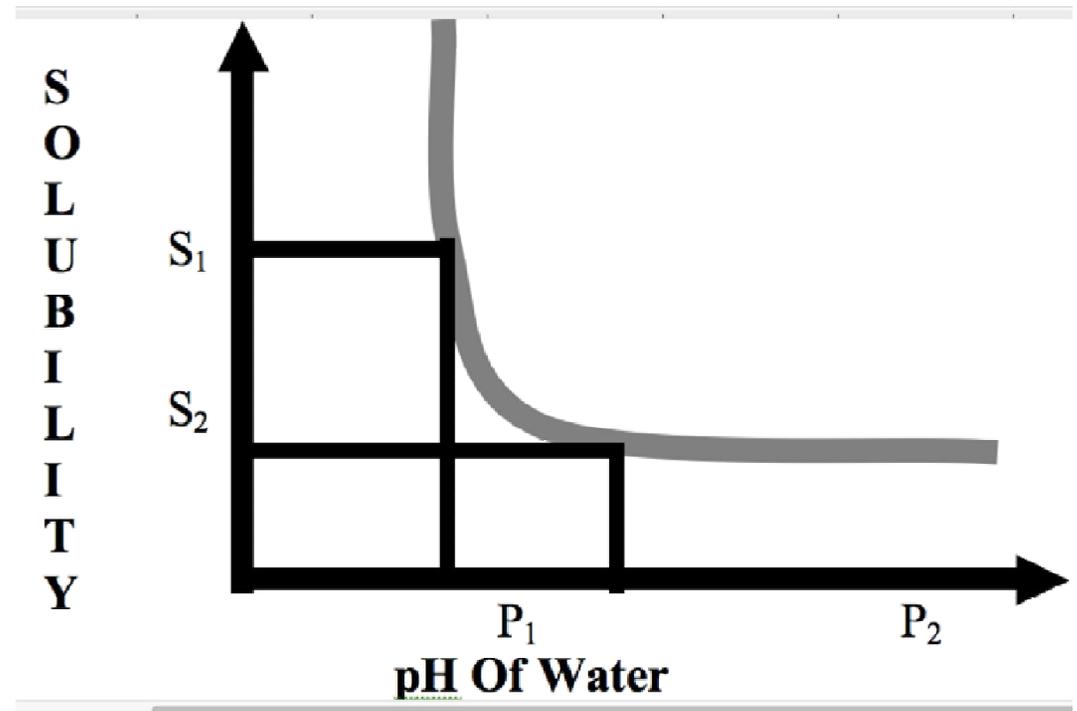


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## How do we do this ?

- From the other graph, we see that when the pH of water is increased the solubility of these salts increase rapidly and there comes a stage where the pH ceases to affect the solubility.
- When the level of solubility has dropped to a level lower than the level as to which it would have been dropped in the case of temperature variation there is no further drop in the solubility when the water comes out of Scale-Ban, thus giving you a complete scale free water.





# How do we achieve this?

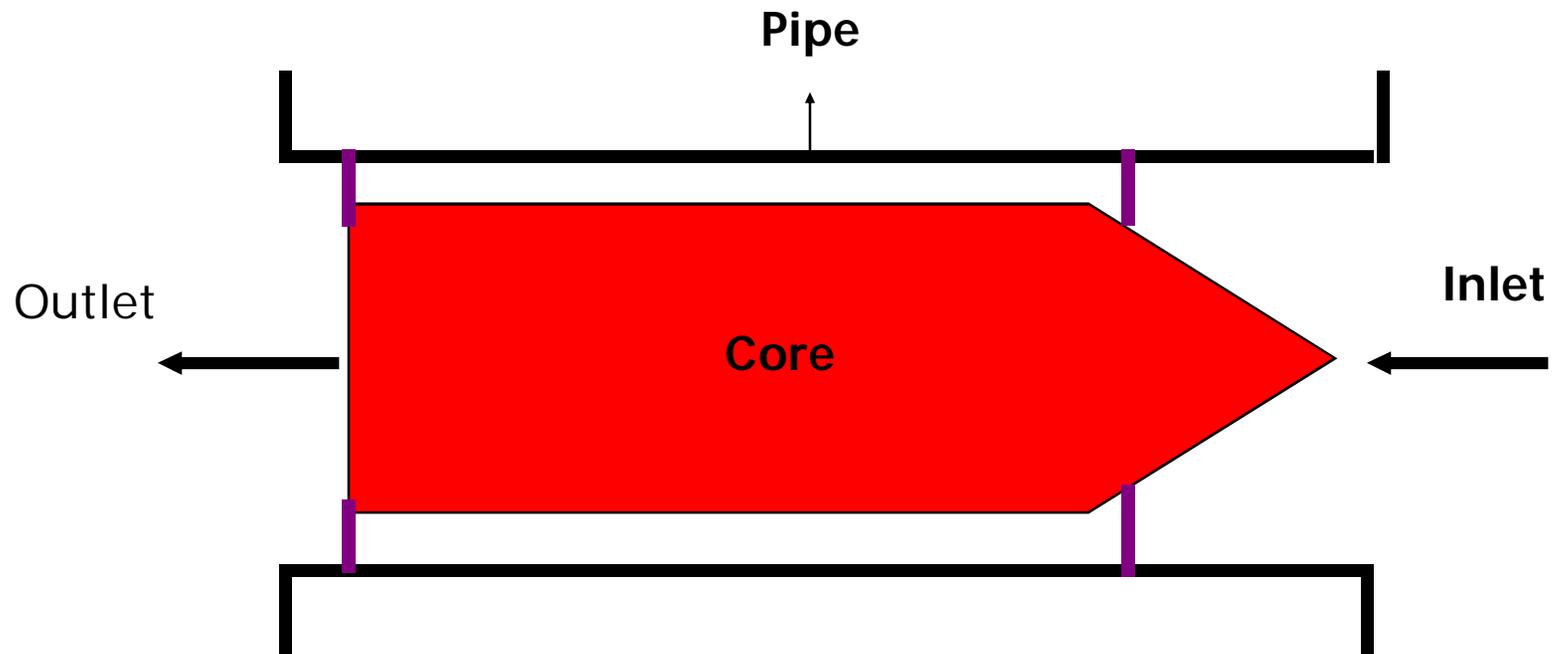
- We know that the numeric value of pH is inversely proportional to the log of concentration of  $H^+$  ions. So in the Scale-Ban we increase the concentration of  $H^+$  ions.
- Scale-Ban has dissimilar metal ions assembled on the core by the process of sintering. When water flows through Scale-Ban, it acts as an electrolyte. Electro motive force is generated between the metal ions and they develop a negative charge. This property allows them to attract all the positive ions towards it but  $H^+$  ion being the lightest is attracted the most. The layer of water covering the Scale-Ban core is mostly that of  $H^+$  ions and the remaining water gets devoid of  $H^+$  ions thus in turn increasing the pH of water.
- When the pH of water rises the solubility of calcium, magnesium salts decreases and their precipitation takes place. The precipitates are of the size of the metal ions, which are present on the core of the Scale-Ban, and their size is less than  $.5\mu$ , this is so small that it remains suspended in the water in the form of colloidal particles and get washed away by the turbulent flow of water.



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# CROSS - SECTION





# Performance check

- You must be wondering that the Scale-Ban does not make any sound, does not take any energy so how do we believe that its performing efficiently. Well for that, we have a chloride check.
  - We all know that chloride never deposits itself on the heat exchange zone. Thus, the ratio in which the hardness in water increases must be equal to the ratio of increase in chlorides.
    - Suppose  $C1$  =total chlorides present in raw water.  
 $C2$  =total chlorides present in recirculated water.
- THUS,  $C2/C1$  will tell us the ratio as to what the chlorides are increasing.

- Say  $H1$  =hardness present in raw water.  
 $H2$  =hardness present in recirculated water.
- Thus,  $H2/H1$  will tell us the ratio as to what the hardness is increasing.
- If the increase in ratio of total chlorides is equal to the increase in ratio of total hardness then system is  $\pm 10\%$  not scaling.
- If the  $C2/C1 < H2/H1$  then the system is descaling.
- If the  $C2/C1 > H2/H1$  then system is scaling.



# Caution

## Limitation

- pH of water should not go beyond 8.5, if this happens the Scale-Ban ceases to perform. The pH can be maintained by the bleed criteria, which will be discussed, in the next slide.
- The flow rate of water should not be below the prescribed flow rate as mentioned in the catalogue. The flow rate can be adjusted by the use of a pump of a slightly higher capacity.
- Thus we see that the two criteria's for the performance of Scale-Ban are very much controllable and can be achieved easily.

## Bleeding Criteria

- We suggest that whenever you are using a circuit, which deals in the recirculation whether you use Scale-Ban or not, you must bleed your water. Bleeding is an important factor, which can control scaling upto a certain extent.

$$\text{Bleeding\%} = \text{Evaporation\%} / n - 1$$

Where n = Number Of cycles.

# Bleed

$$\text{Bleeding(\%)} = \frac{\text{Evaporation \%}}{n-1}$$

Where n= No. of cycles

For e.g.  $E = 0.75\%$   
 $n = 5$

Then Bleeding  
 $= 0.75 / 5 - 1$   
 $= 0.75 / 4$   
 $= 0.1875\%$



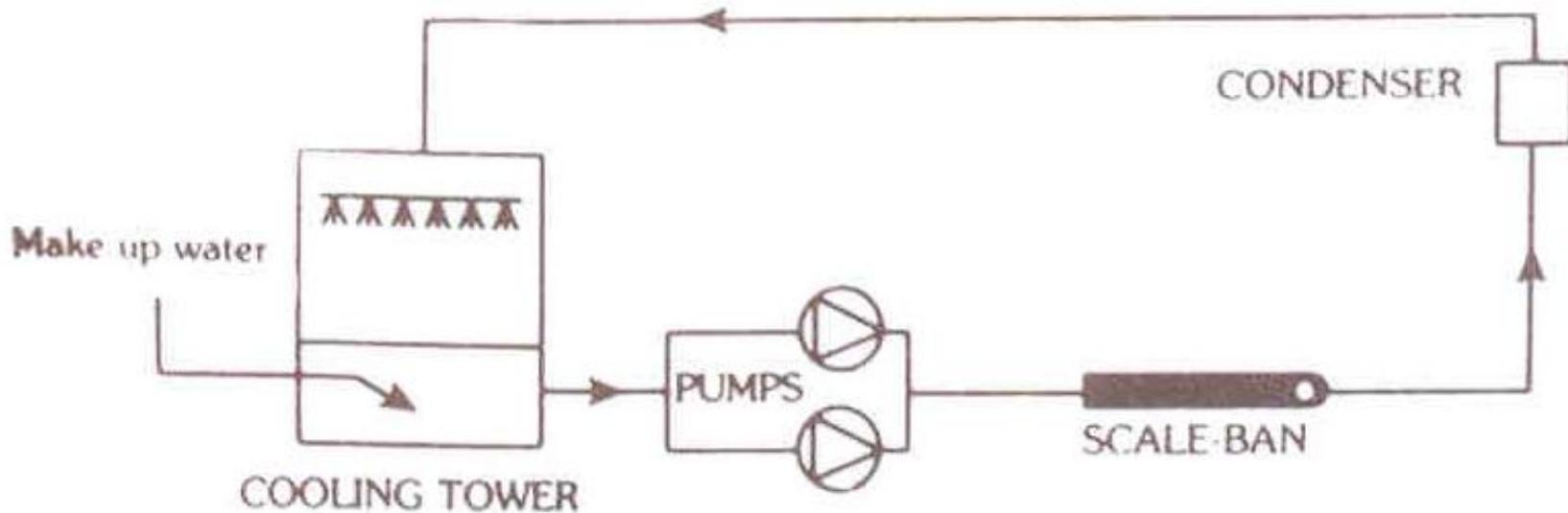
# Advantages

1. Prevention of scale.
2. Removal of scale: Scale-Ban has a property of even removing the existing scale present in the heat exchangers. The periodicity is not known as yet, it may take 15 months, it may take 3 years etc. Thus, Scale-Ban is marketed as a scale preventor and not a scale remover.
3. Scale-Ban treatment does not involve any chemicals.
4. Since there are no chemicals used, therefore there is no pollution.
5. Since there are no chemicals used, therefore there is no corrosion. Scale-Ban itself is a scale preventor therefore there is no chance of corrosion.
6. Scale-Ban is able to work in variable water qualities that mean that Scale-Ban can work in conditions where water hardness is up to 8000 ppm.
7. There are no moving parts in Scale-Ban, thus there is no risk of anything being jammed etc.
8. Scale-Ban is a non-sacrificial equipment.
9. There is no maintenance required. Once installed you it requires nothing-just water.
10. There is no energy consumption in Scale-Ban.
11. The Scale-Ban speaks for itself and gives you a system, which is totally scale free. Thus you do not risk anything when you install Scale-Ban.



# Installation

The installation of Scale-Ban is very simple. It is installed after the pumps and before the heat exchange zone. The distance of the heat exchange zone should not be more than 3 meters and there should not be any static area between the Scale-Ban and the heat exchange area.





# Selection

- Scale-Ban is selected on the basis of-
- Water flow rate
- Water analysis report
- Cooling Water line diagram indicating pipe sizes

# Models available and specifications

MODEL	INTERNAL DIAMETER (Inch)	MINIMUM FLOW RATE (m <sup>3</sup> /hr)	MAXIMUM FLOW RATE (m <sup>3</sup> /hr)
<b>SBA-01</b>	<b>3/8</b>	<b>0.5</b>	<b>1.1</b>
<b>SBA-02</b>	<b>1/2</b>	<b>1.0</b>	<b>1.7</b>
<b>SBB-01</b>	<b>3/4</b>	<b>1.5</b>	<b>3.3</b>
<b>SBB-02</b>	<b>1</b>	<b>3.0</b>	<b>4.8</b>
<b>SBC-01</b>	<b>1 1/4</b>	<b>4.5</b>	<b>8.0</b>
<b>SBC-02</b>	<b>1 1/2</b>	<b>7.5</b>	<b>13.3</b>
<b>SBC-03</b>	<b>2</b>	<b>12.0</b>	<b>21.0</b>
<b>SBD-01</b>	<b>2 1/2</b>	<b>19.0</b>	<b>27.5</b>
<b>SBD-02</b>	<b>3</b>	<b>25.0</b>	<b>44.0</b>
<b>SBD-03</b>	<b>4</b>	<b>40.0</b>	<b>93.0</b>
<b>SBD-04</b>	<b>5</b>	<b>85.0</b>	<b>143</b>
<b>SBE-01</b>	<b>6</b>	<b>133</b>	<b>210</b>
<b>SBE-02</b>	<b>8</b>	<b>198</b>	<b>375</b>

# MODELS AND SEPECIFICATION

MODEL	INTERNAL DIAMETER (Inch)	MINIMIUM FLOW RATE (m <sup>3</sup> /hr)	MAXIMIUM FLOW RATE (m <sup>3</sup> /hr)
SBE-03	10	360	590
SBE-04	12	565	850
SBE-05	14	820	1170
SBE-06	16	1135	1530
SBE-07	18	1490	1940
SBE-08	20	1880	2400
SBE-09	22	2320	2910
SBE-10	24	2810	3475

- ✓ Length of Scale-Ban may vary owing to different water quality. Approximate length is about one meter.
- ✓ Scale-Ban is supplied in flanged or screwed end connections.
- ✓ Scale-Ban is designed as per the minimum flow rates in the equipment so that necessary turbulence is obtained.



# Scale Ban in the Making

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# Installation

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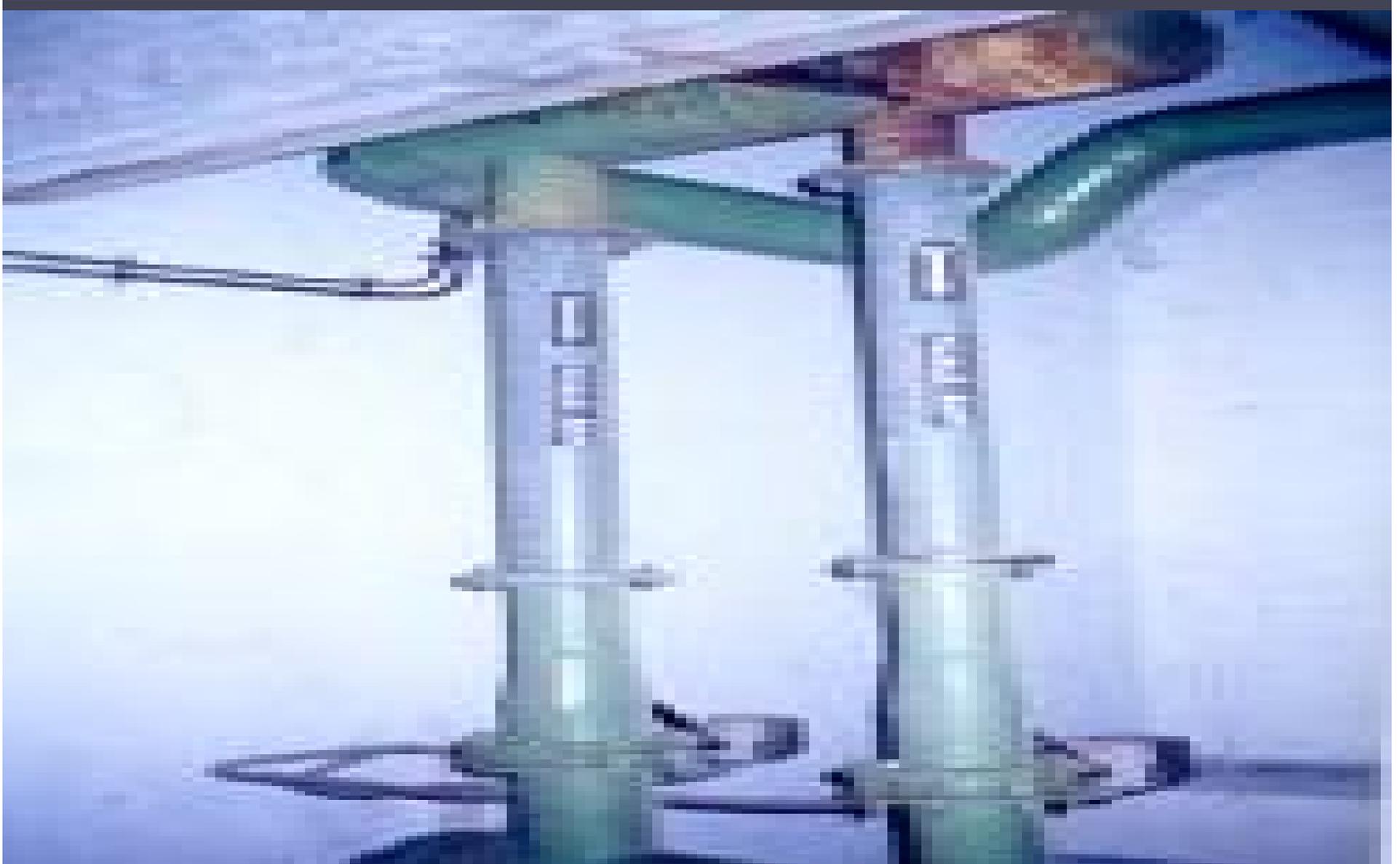




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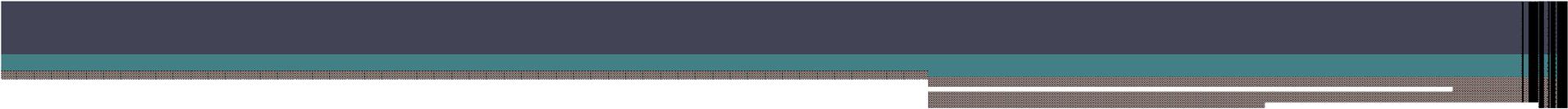




# Mission

**TO PROVIDE THE BEST OF QUALITY  
PRODUCTS  
AT THE MOST ECONOMIC RATES.**





Thank You !!!

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