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# IESL TECHNICAL BULLETIN

Issue 2

March 2004

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## RO CLEANING.

*We have been frequently sought clarifications regarding ORP setting in RO plants, so please find some indicators for the same as below.*

*During Pre-commissioning of RO equipment, operate the equipment without chlorine dosing and allow the water to pass through the ORP sensor and note down the ORP reading say "X". Now set the ORP meter at "X" plus 50 mv.*

*Our laboratory trials at Bangalore have proved that our thumb rule of 0.1 ppm of chlorine contributes approximately 50 - 60 mv on ORP meter is fairly accurate.*

*Hence the setting should always be raw water (without Chlorine) ORP plus 50 mv in order to avoid tripping of pump and avoid chlorine entry to RO equipment.*

*As soon as the ORP meter exceeds "X" plus 50 mv the High Pressure Pump trips and the Auto inlet closes and Dump valve opens making way for chlorine water to be drained.*

**"Myths about ORP"**

*To always set the ORP at a fixed setting like say 300 mv or 500mv irrespective of raw water ORP, please ensure that such mistakes do not occur.*

## II} RO CLEANING:

We have found that at times for heavy scaling / fouling we may have to clean the RO membranes with two different chemical solutions say acidic pH cleaning solution followed by alkaline pH cleaning solution

## III} HARDNESS UNITS

Companies who have either Tie-ups / joint ventures with foreign companies or companies who export their products are stating their technical specifications in their units of concentration so find the following table which will be useful during negotiations / discussions.

There exist different scales of "degrees" of water hardness, one may not know \*which\* "degrees" are being used -- and that creates substantial uncertainty! England that use the "English degree" and others that use the "German degree" etc but talk of "degrees".

Hardness is expressed in terms of English Degree hardness or German degree hardness or even French Degree hardness

Hardness	Conversion value
1 English Degree =	14.3 ppm CaCo3
1 German Degree =	17.9 ppm CaCo3
1 French Degree =	10 ppm CaCo3
1 American Degree =	17.1 ppm Caco3

THE POSSIBILITY OF SERIOUS ERROR (10.0(FRENCH) VS. 17.9(GERMAN) = 79% DIFFERENCE!) IS NOT SO FARFETCHED. SO PLEASE WATCH OUT BEFORE COMMITTING OUTLET HARDNESS.

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# IESL TECHNICAL BULLETIN

Issue 3

May 2004

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## **RO CLEANING.**

This issue of technical bulletin is in order to share some of our experiences in RO cleaning.

Firstly irrespective of the whether there is pressure increase or not and similarly whether flowrate decreases or not , please do take up PREVENTIVE CLEANING once in 2-3 months in order to enhance the membrane life and improve the membrane performance. Preventive cleaning and other Normal cleaning can be given with SERCON cleaners.

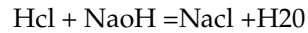
It is always advisable to clean the RO equipment membrane wise so that the contaminated cleaning solution does not enter the next membrane. The improvement in performance when single membrane cleaning is done is so substantial that customers will ask for it each time. This is possible by carrying our portable cleaning system with single element pressure tube to site .The existing portable cleaning system can be used for both 4 “ and 8 “ membrane RO equipment. In case individual membrane cleaning is not possible due to higher capacity RO or distance of site please do take up individual pressure tube cleaning. NEVER EVER CLEAN 2-3 PRESSURE TUBES AT A TIME.

## **SOAKING RO EQUIPMENT IN RO PERMEATE WATER.**

The other interesting experience is SOAKING RO membranes in RO permeate water during short-term shut down or even before cleaning. In case the membranes have scaled due to high salt concentration, soaking in RO permeate water will certainly help by the way of salt getting dissolved in RO permeate water and reducing the salt concentration on the membrane surface.

**Caution 1:**

In case of cleaning the RO equipment with hydrochloric acid, do not add NaOH as it ends up in cleaning the RO equipment with NaCl(Salt) at low pH.

**Note:**

NaOH can be added only to citric acid for pH adjustment.

**Caution 2:**

Please check up the brine seal during every service as in case the brine seal has torn / cut off, the RO equipment would be operating at higher recovery leading to scaling.

**Caution 3:**

Similarly for INDROs wherein we don't have flowmeters there is tendency of operating the equipment at higher recovery so please do measure with alternate methods and educate customers not to exceed the design parameters or else offer to modify and install rotameters.

**Caution 4:**

There is a general tendency to close or sometimes control the flowrate of reject and especially reject recirculation valve leading to scaling and increase in " $\beta$ " factor or concentration factor respectively.

**Suggestions:**

1. In case of heavy scaling / fouling, please do the cleaning in cycles instead of 3-4 cleanings in 2-3 days i.e clean the equipment every alternate day say for a week and the RO equipment should be operational during the other alternate days..
2. It is always advisable to do Normalisation calculation atleast once in 2 months for all RO customers, which is on a simple Excel Sheet.(Circulated to all).
3. During cleaning of the RO membranes with two different type of chemicals, please ensure that cleaning tank is thoroughly cleaned with permeate water and if required with clean cotton.
4. PLEASE CHANGE END CAP "O" RINGS, BRINE SEALS

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