

Monthly Magazine  
August 2009 Edition



AQUA D'



EXPRESS



# MD's Desk

Dear All,

Kudos to HR Department for organizing a visit to St. Thomas Babies Home for abandoned kids and that too on a memorable day like our Independence Day as part of our CSR activity.

It was also overwhelming to see all our associates come forward and contribute in cash and kind for a noble social cause like this.

CSR is the deliberate inclusion of public interest into corporate decision making. Corporate responsibility has the impact on the environment, consumers, employees, communities, stakeholders and all other members of the public sphere. At a time when the entire world is waking up daily to the news and jargons about environmental safety, global warming, conservation of water, etc, I think it would be ideal for us to focus our CSR activities in educating the masses preferably our future generation. For this we should target schools and colleges and make them aware of the importance of safeguarding our natural resources which is fast depleting due to our misuse.

I see lot of interesting training programs being initiated and organized by the HR Department. Rapid technological innovations make it a necessity for the Staff to update their knowledge and skills as they have to work in multidimensional areas. Hence I want all our Associates to wholeheartedly participate and improve their technical and soft skills and benefit from the same. I appreciate the efforts taken to conduct these sessions in order to awaken and rekindle the spirit of the participants. I would like to see many more such sessions in the future.

Water Industry is passing through challenging and exciting times. At this juncture, keeping ourselves updated through various training will help our company to overcome the challenges needed to meet the needs of clients and emerge significantly in value and quality and achieve customer satisfaction which is our ultimate goal.. It is they who make things happen for us. Let us reciprocate.....

Regards,



S. Suthakar  
Managing Director

## Impurities in water:-

Practically speaking no chemical is pure, whether naturally occurring or artificial. Anything in water that is not H<sub>2</sub>O is a contaminant or impurity.

Impurities in water are generally classified as

### 1. Biological

### 2. Un dissolved

### 3. Dissolved.

#### 1. Biological impurities:-

This includes various types of bacteria and fungi. These are unicellular, microscopic organisms and require moisture & atmospheric oxygen for growth. Microscopic fungus can infect piping lines, infects skin of bathers in swimming pools. A pathogenic bacterium causes diseases. Examples of pathogenic bacteria are (i) Escherichia coli (E.Coli) 2. Pseudomonas dimunuta.

#### 2. Undissolved impurities:-

**a. Suspended solids:-** They are present mostly in surface water, which are due to dirt, clay, mud, silicious matter. They clogging of piping systems, abrasion of pumps & equipments. The suspended solids level is normally measured in ppm.

**b. Colloidal particles:-** These are particles of size smaller than 0.2 microns. Present in mostly surface waters. These particles have an electrostatic negative charge on its surface. It is this surface which causes the colloidal particles to repel one another, thus maintaining the stability. Colloidal particle in water causes clogging of process equipments. This impurity level is normally measured in NTU (Nephelometric Turbidity Units).

#### 3. Dissolved impurities:-

**a. Gaseous impurities:-** The gaseous impurities encountered in water are oxygen, carbon dioxide, Hydrogen sulfide, chlorine and sometimes ammonia. Surface water is saturated with gases. Ground waters may be high in carbon dioxide. The gaseous impurities are normally measured in ppm. These impurities cause corrosion of Hot water systems, boilers and condensate systems. Gases also affect taste of drinking water.

**b. Organic matter:-** Dissolved organic matter is present mostly in surface waters. They are present in the form of high molecular weight carboxylic acids, collectively called as humic, fubic and tannic acids. These organic matters are formed in natural water by the degradation of vegetable matter like plant leaves. They give bad taste, odour & colouration to drinking water, causes problems in ion exchange treatment units & high pressure boilers.

**c. Non ionic impurities:-** These include COD, BOD, total organic carbon and silica. Soluble silica is present in monomeric form. They are present in all natural waters to varying degrees. Silica is believed to be non-ionic although soluble in water. Silica in water causes deposits and scales on HP boilers & Turbine blades.

**d. Ionic impurities:-** These ionic impurities are further subdivided into cations and anions. The positively charged ions are called cations and the negatively charged ions are called anions. These ions move freely in a solution.

i. Cations:- The cations present in natural water include monovalent ions like sodium, potassium & aluminium, divalent ions like calcium, magnesium, ferrous & manganese and trivalent ions like aluminium.

ii. Anions:- The anions present in natural water includes monovalent ions like bicarbonates, chlorides, nitrates & fluorides and divalent ions like carbonates & sulphates.

#### **Units:-**

Ionic impurities are measured in mg/l (or) g/l (or) ppm = (mg/l) / specific gravity of solution (or) meq/l = (mg/l) / equivalent wt.

In water chemistry, ionic concentrations are usually expressed in terms of calcium carbonate,  $\text{CaCO}_3$ . This is a fortuitous choice because the molecular weight of  $\text{CaCO}_3$  is 100 and its equivalent weight is 50. Providing a convenient unit of exchange for expressing all ions in water rather than showing each with its own equivalent weight. This is comparable to having the dollar as convenient unit of exchange in international currency, rather than dealing in a mixture of pounds, Rupees and francs.

For example, if an analysis shows that there are 40 parts per million of calcium present expressed in terms of the ion itself, then it can be converted in terms of equivalent calcium carbonate as follows:

$\text{Ppm as CaCO}_3 = 40 \times 50 / 20 = 100 \text{ ppm of calcium as CaCO}_3$ .

In general, Ions expressed in ppm as  $\text{CaCO}_3 = \text{Ions expressed in ppm as such} \times \text{Equivalent weight of the ion}$ .

### **Principle of Electro neutrality:-**

This principle states that in any given solution the sum of cations is numerically equal to the sum of anions. When all the ions are expressed in same units. i.e.,

$(\text{Cations all expressed in ppm as CaCO}_3) = (\text{Anions all expressed in ppm as CaCO}_3)$ .

### **Water composition:-**

**Hardness:-** Tradition defines hardness as the soap consuming capacity of water. For practical purposes, it is the calcium and magnesium content of water. Hardness is the solution in water of both calcium and magnesium as cations, independent of the nature of the anions present.

Hardness of the water can be classified as

(a). Temporary hardness is caused by the presence of calcium and magnesium cations associated with bicarbonate anions. Temporary hardness is mostly destroyed by mere boiling of water.

(b). Permanent hardness is due to the presence of chlorides, sulphates and nitrates of calcium & magnesium. Unlike temporary hardness, permanent hardness is not destroyed on boiling.

**Equivalent mineral acidity:-** The sum of the anions chlorides, sulphates, nitrates, fluorides & phosphates all expressed in the same units is called as Equivalent mineral acidity.

**Alkalinity:-** Alkalinity is the quantitative capacity of the aqueous media to react with hydrogen ions. The alkalinity of natural water is normally due to the presence of bicarbonate, carbonate and hydroxide compounds of calcium, magnesium sodium and potassium.

**pH:-** pH is a measure of acidity or basicity of a solution. Acidic solutions have  $\text{pH} < 7$ . Basic / Alkaline solutions have  $\text{pH} > 7$ . Natural solutions have  $\text{pH} = 7$ . pH is calculated as  $\text{pH} = -\log(\text{H}^+)$ .

**pH Alkalinity relationship:-** The alkalinity which exists above the pH value of 4.3 is termed as methyl orange alkalinity. This alkalinity which is also the total alkalinity is due to the presence of bicarbonate, carbonate and hydroxyl anions.

The alkalinity which exists when the pH value is above 8.3 is defined as PAlkalinity. In most natural water supplies, the pH is less than 8.3, so there is no PAlkalinity. The alkalinity due to bicarbonate ions exists when the pH value is in between 4.3 to 8.3 and the alkalinity due to hydroxyl ions exists when the pH is above 8.3. The carbonate ions exist when the pH value is in between 50% above and 50% below 8.3.

### **Hardness Alkalinity relationship:-**

When total hardness is less than or equal to total alkalinity, then all the hardness is temporary hardness and the permanent hardness is zero. If the total hardness is greater than total alkalinity, then the temporary hardness is equal to the total alkalinity and permanent hardness is the difference between total hardness and temporary hardness.

# Events of the Month



This month turned out to be very eventful as it witnessed an array of training programs conducted for the benefit of the Staff.

An interactive session on Inter-Personal Skills was conducted by **Mr. Ganesh Psychologist** representing “**ROOTS & WINGS**”. This helped the associates to get to know themselves in a better way and clear any kind of mental blocks and to have a clear work life balance



A Technical training on automation and PLC was conducted by **Mr. Anguraj** of **M/s. Siemens**. The training had a good response in form of participation and interaction. Participation certificate was given to the participants with the note of thanks and followed by a training feedback.





The training on Safety Awareness was conducted by **Mr. Prakash**-Divisional Manager of **M/s. Usha Fire Safety Pvt Ltd** who educated us about the basic safety tips and the need of Common sense, Presence of mind, and right attitude- for safe living. The drill with live fire was the highlight.



There was a training session on Business communication conducted by the HR dept. which was a very interactive.

For freshers the following training was conducted to get them familiar with the systems

- a. SAP Induction conducted by **Mr. Avinash** Systems Engineer
- b. ISO Induction conducted by **Mrs. Rama** Management Representative



## **INDEPENDENCE DAY**

Our Independence Day was celebrated in a poignant way with a visit to the St. Thomas Babies Home at St. Thomas Mount. All our associates contributed wholeheartedly in cash and kind which was delivered to the nuns taking care of the abandoned kids in the home.



## **New Comers in Aqua Designs**



**K. Venkatesan** has joined our team as Engineer Designs. He has experience in detail engineering, piping drawings etc for last two years.

## **New Projects**

### **Lanco Industries Limited, -STP**



Lanco Industries Limited (LIL) was incorporated on 1st November, 1991 by Lanco Group of Companies to manufacture Pig Iron using Korf (German) technology and Cement. The unit is located at Rachagunneri Village on Tirupathi - /Srikalahasthi road which is about 30 kms. from Tirupathi and 10 kms. from Srikalahasthi. Aqua Designs has bagged the order for supplying 3 MLD Sewage Treatment Plant.

### **Ford India Private Limited, WWTP Plant**



Ford Motor Company, an American company, manufactures and sells [automobiles](#) worldwide. The company has invested heavily in India to give the finest in automobiles. Rs. 1700 crore has been invested in integrated manufacturing plant at Maraimalai Nagar, 45 kms from Chennai. Aqua Designs has been entrusted with the job of supplying 600 KLD Recycling Plant and 500 KLD Demineralization Plant.



We only have one world,  
We have so little time together you and I,  
We just need to Recycle water

*Talk to Aqua Designs for all water  
and waste water treatment solutions*



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