

# Fremont Focus Quarterly Newsletter

## Inside this issue:

### Focus on Cooling Towers

Minimizing Water Usage	2
The Use of Corrosion Coupon Testing	3
Fremont Biological Control Program	4
Techo Corner Quiz on Cooling Towers	4

### Fremont facts:

- Fremont has 50 field personnel in 15 states
- Fremont has over 3,500 customers.
- For 55 years, Fremont has been providing quality service and products.
- Fremont's exclusive Ultra Series products supports your efforts to go green.

## Fremont's Laboratory Support for Customers

The Fremont Water Management Laboratory is staffed and equipped to provide accurate and expedient laboratory support to clients, potential customers and field personnel.

The laboratory is housed in the manufacturing facility with over 5,000 square feet of this facility dedicated to laboratory space.

The lab staff of degreed chemists and chemical engineers have more than 50 years of experience in the water treatment industry.

Sophisticated laboratory equipment available for laboratory investigations includes an Inductively Coupled Plasma (ICP) Spectrometer and a Fourier Transmission-Infra Red (FT-IR) Spectrometer.



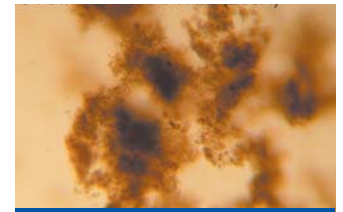
ICP Spectrometer in use



FT-IR Spectrometer in use

Laboratory support includes:

- Metallurgical Examinations
- Deposit Constituent Determinations
- Water Parameter Analysis
- Microbiological Surveys
- Corrosion Rate Studies
- Ion Exchange Resin Examinations
- Biocidal Efficacy Reviews
- Wastewater Treatment Product Screenings
- System Volume Determinations



Analyzing Biofilm make-up

When not at the lab bench, the Fremont technical staff supports our customers through phone and written contact, customer site visits and participation in Fremont training seminars.

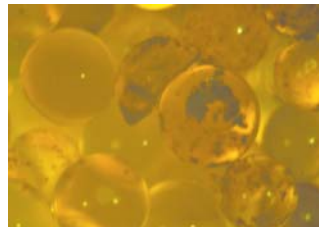
The commitment of laboratory resources to research and development ensures our customers that the most current technology available is utilized in Fremont's custom formulations.

Multiple US Patents have been awarded to Fremont Industries for its unique technologies: **Ultra Series Program** of concentrated, crystalline technology and contact-free delivery systems.

**White Rust Series Technology** to prevent corrosion of galvanized metal without pH control.

**Premier Series Products** proven in the removal of deposits from boiler and cooling tower systems without taking these systems off-line.

Our dedicated laboratory staff is here to give you the best support and water treatment for your operation.



Resin Bead Analysis



Wastewater Treatment Analysis



Pipe Corrosion Analysis

## FREMONT FOCUS: Cooling Towers

### Cost Saving Methods to Minimize Water Usage

Cooling towers continually make up water due to evaporation and removal of concentrated water. Our goal is to minimize the amount of bleed off water while controlling the potential buildup of solids.

#### Cooling Water Management

System water chemistry and conditions are continuously monitored to optimize water use, water treatment corrosion inhibitors/deposit control agents, and microbiological control agents. Similarly, incoming makeup water is monitored for changes in characteristics. If the water quality gets worse, perhaps softened makeup water becomes viable. If the water quality improves, the cooling tower may be able to operate at higher cycles, which will reduce blowdown and makeup rates. Also, there are improved treatment chemistries becoming available that may allow the Langelier Saturation Index (LSI) of a system to approach 3.5 instead of the standard 2.5. Operating at a higher LSI would allow for higher cycles that would reduce blowdown and makeup. It should be cautioned, though, that precise control of the cooling tower water chemistry becomes vitally important as the LSI is increased. The risk of scale formation on heat transfer surfaces can be greatly increased even with small system upsets. The benefits of operating at higher LSI versus the risk to the system must be measured.

#### Softened Water Benefits

Calcium and magnesium are usually the two main scale formers in a cooling system. By removing these ions with a water softener, the cooling tower is able to operate at

higher cycles of concentration. This reduces the amount of blowdown and makeup water required.

#### Cost Savings From Blending

The softener regeneration costs (salt and water) may make using 100% soft makeup uneconomical for a cooling tower. By using a blend of hard water and soft water, the cooling tower may still be able to operate at higher cycles requiring less blowdown and makeup water. The most economical balance for the blend will have to be calculated.

#### Adding Acid to the System

Feeding acid to a cooling tower system will increase the solubility of calcium and salts, and allow for higher cycles to be achieved. Many facilities have acid-handling safety concerns that make them shy away from this alternative. Feeding acid to a system can reduce the blowdown and makeup rates required.

#### Benefits of Recycling

Some wastewaters are of high enough quality to use as cooling tower makeup without any extra treatment. Waters used for once through cooling can be collected and used for makeup. It may also be possible to treat wastewater to achieve a high enough quality for cooling tower makeup. This has the double benefit of reducing the wastewater discharged from a plant and reducing the blowdown and makeup water required. The problem with recycling wastewater could be the organics loading. High organics will mean a greater potential for bacteria growth. Monitoring bacterial colonies, BOD, and COD becomes paramount in this type of feedwater.

#### Blowdown Management

Cooling towers are far too dynamic for manual control or malfunctioning controllers. Having a good controller to keep the system operating at the proper conductivity will help minimize water usage and the risk of scale. Remember, if a cooling tower's conductivity is below parameters, more water is used than necessary. If the cooling tower's conductivity is above parameters, the risk of scale and corrosion increases.

#### Proper Maintenance

Water leaks in the process or in the cooling tower itself are uncontrolled water loss that could be considered another form of blowdown. Leaks start to become a problem when the cycles of concentration or conductivity in a cooling tower cannot be maintained. This occurs because the rate of water loss due to leaks has exceeded the rate of water loss required for blowdown. If a cooling tower system is not blowing down, but is still having trouble maintaining the set conductivity, this is a sign of an excessive leak in the system. As a result, the cooling tower will also require more makeup water than it normally would. These are the main ideas on how water usage can be minimized for cooling towers. With a little creativity, more can be found. When striving to minimize water usage, be sure to stay within the recommended operational parameters for the system.

#### Fremont Difference

At Fremont, we see ourselves foremost as a service company who happens to sell top of the line products for your water treatment needs.

*There are numerous ways to minimize your water usage and Fremont can assist in making that happen.*

Fremont Industries, Inc.

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# FREMONT FOCUS: Cooling Towers

## The Use of Corrosion Coupon Testing

Corrosion coupons are an inexpensive, effective method for monitoring the corrosion rate in any system or structure. However, obtaining meaningful results from these tests is not always as simple as measuring the weight loss and calculating the uniform corrosion rate. Surface finish, coupon placement and test duration significantly affect the caliber of your data. The following is designed to be an overview of corrosion coupon testing and how to obtain the most reliable data.

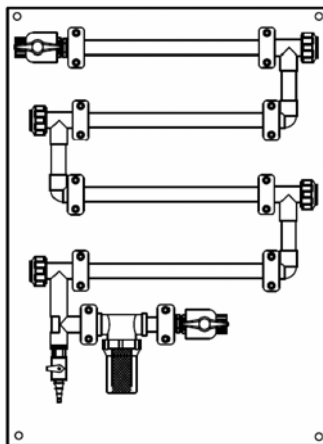
Corrosion coupon testing is an in-line monitoring technique; coupons are placed directly in the process stream and extracted for measurement. This monitoring technique provides a direct measurement of metal loss that allows you to calculate the general corrosion rate.

### Benefits of Corrosion Coupon Testing

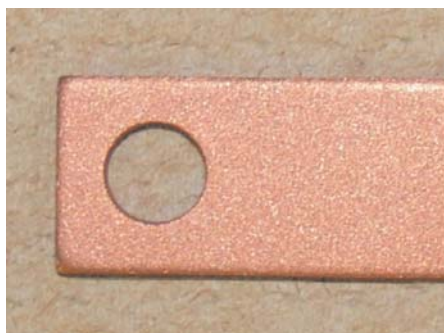
- Simple and straightforward principle.
- Provides specimens for post-test examinations.
- Allows comparison between different alloys and inhibitors.
- Assesses all forms of corrosion at low cost.

Corrosion coupons are most frequently used to investigate general corrosion and determine the corrosion rate based on weight loss of the coupon. However, various other forms of corrosion can be examined with these coupons:

- Crevice Corrosion - Special washers/spacers are available to simulate crevices where the coupon surface is partially blocked from the liquid.
- Pitting - This type of attack may be evaluated by visual or microscopic examination of the coupon. Use large surface area coupons since the number of initiated pits is proportional to the surface area of the specimen.
- Galvanic Corrosion - Coupons of different alloys may be placed in electrical contact to show susceptibility to stress corrosion cracking. Special coupons such as Crings and U-bends are available to investigate the occurrence of this form of corrosion.
- Scaling - Special coupons with various hole diameters are used to visually assess the extent and severity of scaling problems.



Corrosion Coupon Rack



New Corrosion Coupon



Exposed Corrosion Coupon

### Limitations of Corrosion Coupon Testing

- Measures only the average corrosion rate during the time of exposure.
- Corrosion rates can only be calculated after coupon removal.
- Short exposure periods can yield unrepresentative corrosion rates, especially for alloys that form passive films, such as stainless steels. Normal exposure periods frequently approach 90 days.

Selecting coupons, exposure locations, and selecting the correct alloy to use as your corrosion coupon is by far the most important step in this process. If concerned with the general corrosion rate of a system or structure, designate a material that is identical, or as close as possible, to the material of construction. For example, select mild steel coupons for use in most cooling towers and copper coupons for service in copper heat exchangers. Consult your vendor if unsure of the material of construction. Also, test duplicate specimens to validate your results.

To obtain the most meaningful results, the surface finish and stress condition of the coupon should be identical to that of the structure of interest. This is usually impossible because it is difficult to duplicate mill scale and heat treatments of large structures in individual coupons. The best advice is to be consistent in your tests and specify a particular surface finish, such as 120 grit or glass beaded.

The location of the coupon in the process often dictates coupon size and dimensions. Obviously, if the coupon must be inserted into the process through a one inch, full port valve, the coupon width must be less than one inch. Test racks allow for the simultaneous testing of multiple coupons. Be sure that the test rack can be inserted and retrieved at appropriate times. Confirm that test racks and insertion rods are resistant to corrosive attack from the test environment. Also, to eliminate any galvanic effects, check that the coupons are electrically isolated from the test rack. Broken test racks or loose coupons can destroy pumps, mixers and tanks; i.e. a coupon that, for whatever reason, has broken away from its test rack. Galvanic corrosion and/or crevice corrosion sites can be created, resulting in the rapid attack of the pipeline or storage tank.

Your Fremont Account Manager will work with you to determine the best coupon testing program to help maximize the results of your treatment program. The Fremont laboratory staff will be there to verify that you are getting the best protection for your facility.

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# FREMONT FOCUS: Cooling Towers

## Techno Quiz Corner on Cooling Towers

What one simple mechanical upgrade to your cooling tower program will:

1. Reduce or even eliminate plugged spray nozzles and distributors.
2. Keep tower sumps free of most sludge and disgusting debris.
3. Enhance cooling system efficiency by reducing risk of deposition.
4. Boost both biological and scale inhibiting protection of your water treatment chemistries.
5. Reduce corrosion caused by erosion.

Answer \_\_\_\_\_

See answer at the bottom of the page



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*Fremont brings to bear  
excellent,  
state-of-the-art  
biocontrol products  
coupled with  
outstanding, hands on,  
in-plant services.*

## Fremont's Biological Control Program

There are four primary functions that accurately describe an effective water treatment program for cooling tower/condenser water systems. These functions are:

1. Scale/Mineral Deposit Control
2. Corrosion Control
3. Biological Fouling Control
4. Utility(ies): Water, Sewer, and Energy Conservation

Of these four areas of focus, our industry, in general, and organizations such as CTI (Cooling Technology Institute) in particular, have recognized for at least the past 15-20 years, that control of cooling water system's biofouling is the area requiring the most attention and effort. In addition to other concerns, we know that an uncontrolled system, biologically, can lead to accelerated corrosion rates and perhaps at the same time could see a dramatic increase in energy consumption required to overcome biofouling slime's formation.

Thus, we have in our product line a wide variety of biocides,

biostats and biodispersants. It is our standard recommendation that all cooling tower/condenser water system's treatment programs contain at least a dual biocide program.

The two types of product should be a non-oxidizing type biocide and the other biocide an oxidizing type product. The latter material can be either chlorine, bromine, chlorine dioxide or ozone which allows our treatment approach(es) for any cooling system to fall well within the parameters established by the US EPA and CDC agencies.

At present, Fremont is actively investigating microbiocide technologies which will extend the oxidative portion of our product line offerings. These proven technologies will increase our capability to ensure that excellent biocontrol is obtained in our treated systems and will provide desirable "green" biocide programs.

The addition of a multifunctional biodispersant, such as our BioDispersant 2 or

3 is both an excellent addition to most treatment program's biocontrol program **AND** it is industry recognized as a "green technology". Thus, utilizing a properly selected oxidizer/non-oxidizer biocide treatment program, and then periodically supplementing that scheme with BioDispersant 2 or 3, will produce great results in biopenetration and biofilm removal. Everyone can be very proud of this product group's effectiveness and its environmentally friendly impact.

In summary, Fremont brings to bear excellent, state-of-the-art biocontrol products, coupled with outstanding, hands-on, in-plant services. Whatever your biological control concerns may be, you can be assured that from our ISO 9001 production plant, to our modern R&D laboratories, to our customer service team, you will find an attentive ear geared toward solving your problems. **WE'RE LISTENING!**

### Techno Quiz Corner Answer Filtration!

The most common, simple upgrade commonly overlooked in a well managed cooling tower program is filtration. Filtration can be achieved many ways, from old tee shirts stuffed into shot feeders (not recommended, but actually observed) to sophisticated media filters with automatic backwash cycles. If you are not using filtration in your open cooling systems talk to your Fremont account manager soon. See how you can start making your maintenance easier, reduce your biological and deposition risks, and save money all at one time.