

PRODUCT TESTIMONIAL

"RO" & "UF" Cleaners



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THE RO CLEANING PROGRAM OVERVIEW

In my opinion, it would not do this Program justice if I were to give testimony concerning these products on an individual basis. To grasp a better understanding of what these chemicals are really capable of, I am going to address the entire program.

This is my personal experience using **The RO Cleaning Program** developed by **Clear Solutions USA**.

Chemicals Used:

- **“ALKALINE MEMBRANE CLEANER,”** a 18% caustic cleaner w/ additives, including the “Surfactant LLR”;
- **“MEMBRANE ACID CLEANER,”** including the “Surfactant LLR”;
- **“M ENZYME,”** an enzyme cleaner;
- **“PERACETIC ACID; and**
- **SODIUM METABISULFITE.**

THE RO MEMBRANE CLEANING

1. The RO Membrane is bombarded by many outside factors, some of which can introduce contaminants. A few of these factors are product quality, product temperature, raw silo rotation, water quality, and time to clean.
2. When designers develop new RO systems, they usually leave extra membrane surface to accommodate early fouling.
3. When the membranes are new, the extra surface area is not that important. However, as the membranes age, the extra surface comes into play. Of course, the designers have no idea what the future demands will be for the system.

With increased production, the system becomes fouled and wash times, shortened. This is because permeate is produced slightly faster than what the RO membranes can process, so it is important that the RO membrane is cleaned quickly. An unclean RO membrane causes production to slow, making the raw silos hold product for too long and the acid production in permeate to rise. The resulting drop in pH levels means less citric hydrochloride will be used.

This is problematic because the citric acid keeps the calcium in suspension. If calcium precipitates out of solution, the RO process will be slowed down further. Inevitably, if the system starts slowing down, additional issues arise upstream and down.

I am sure all sanitation managers using RO systems have had to deal with these cascading events.

Cleaning Process

There are many cleaning programs that have been developed over the years, all of which will work under the right conditions. At this plant, we depend on using all of the membrane surface area, with solid production at 21% maximum. This must happen every day just to keep up with the production.

Clear Solution:

The Clear Solutions Program is as follows:

- Pre rinse;
- Short Alkaline Wash, for the removal of heavy soil, 15 minutes.
- Alkaline Caustic Wash, 30 minutes.
- Rinse Acid Wash, 20 minutes.
- Alkaline Caustic plus Enzyme Wash, 30 minutes.
- Soak Cycle, using “Peracetic Acid” or “Sodium Metabisulfite”, 1 hour.

I will leave the Chemical makeup of each product to the experts, **Clear Solutions**. A description, with regard to my utilization of the products, is as follows:

Membrane Alkaline Membrane Caustic Cleaner Wash Cycles

During each Caustic Wash Cycle a mixture of 18% Caustic and the other additives, which include **The Clear Solutions Surfactant**, are added under pH control. This process eliminates the need to add the surfactant separately. As demands for pH increase, more Surfactant and Caustic are added. We maintain at pH of 10.8 to 11.2.

- ★ The need for Surfactant is always met through the wash cycle.

Membrane Acid Wash

The Acid Wash Cycle is 20 minutes long. The acid membrane also has the LLR Surfactant in it and it is at the same level as the Alkaline Membrane Caustic. This is an important step, depending on the mineral content of the product and the water quality.

- ★ The LLR helps both with cleaning and with the rinse time.

Alkaline Membrane Caustic Wash w/ Enzyme

The Enzyme Cleaner developed and manufactured by Clear Solutions improved this step greatly.

Before introducing Clear Solutions to our system, this step showed very little enhanced cleaning ability, as one would expect when using an Enzyme Wash. The results were consistently poor, no matter which chemical company I used.

This step follows the same cycle as the Caustic Wash step. The only difference is that the system stops every 10 Minutes of wash time to allow the enzyme to work for 5 minutes. Therefore, each Wash Cycle is 30 minutes with an additional 15 minutes of soak time.

Following the Rinse, the system is either put in a Sodium Metabisulfite or a Peracetic Acid soak. Our membranes last between 14 and 18 months. Our wash cycles are short compared to other programs. This allows for more production or extended time to soak the membranes after the wash.

The M Enzyme Cleaner developed by Clear Solutions is a true advancement in membrane cleaning. If I were only allowed one chemical per vendor, it would be a hard choice, but I would have to say that The Clear Solutions Enzyme Cleaner would be my choice. It is, by far, superior to any other material on the market, bar none.