

CHEMICAL CLEANING PROTOCOL – UF

Objective of the Chemical Cleaning

Membrane chemical cleaning is an important part of any ultra filtration maintenance program.

Different types of fouling with consequent choking can cause decline in performance of ultra filtration for effluent/sewage treatment:

- a) Biofouling on the membrane surface.
- b) Formation of mineral scales on membrane surface.
- c) Organic fouling.

Membrane fouling

Foulants lodged on the membrane surface and within pores can cause flux loss (permeate flow), an increase in feed and reject pressure.

Therefore, periodic chemical cleanings as suggested by Aqua Designs is imperative to be implemented as a preventive measure to prevent choking of the membranes and decline in plant performance in terms of recovery and permeate quality.

General Guidelines

Clean membranes on a regular basis as a preventive measure or when normalized permeate flow deviates by about 10%-15% from the design limits.

Depending on the type of fouling it may be necessary to clean either only with **Aquazzol 802** (Organic Cleaner) or followed by **Aquazzol 803** (Disinfectant) and **Aquazzol 602** (Scale cleaner).

Plant operating data must be recorded as mandatory requirement. Parameters such as flow rate, pressure, etc. must be logged and kept recorded for further improvement in plant performance.

When different chemicals are used for cleaning, ensure the pipeline is flushed clean off the previous chemicals by opening the drain valve before adding the second chemical.

Flow rates during cleaning, must be sufficient to remove foulants from the membrane element but should not exceed manufacturer's limits. Flow rate should be within a value such that it does not result in exceeding the feed pressure and pressure drop limitation determined by the membrane element manufacturer.

Cleaning Procedure

UF Permeate water, RO Permeate water or DM water is highly recommended for chemical cleaning.

CIP Tank Capacity: Depends upon the number of modules to be cleaned at a time.

Suction hold up volume: 150 -200 litres of water

1. Aquazzol 802:

Determine **Aquazzol 802** quantity by the following formula and mix it in 200 litres of RO /DM water permeate. pH is to be maintained not less than 10 or greater than 12.

If pH<10 add 50ml of **Aquazzol 802** and mix the contents thoroughly.

Check the pH. If pH is not attained repeat additions of 50 ml **Aquazzol 701** followed by thorough mixing till pH 10 is attained.

Quantity of **Aquazzol 802** = 2 kg per membrane.

2. Aquazzol 803:

Determine **Aquazzol 803** quantity by the following formula and mix it in 200 litres of RO /DM water permeate. FRC 200 ppm is to be maintained.

Quantity of **Aquazzol 803** = 2.5 kg per membrane.

3. Aquazzol 602:

Determine **Aquazzol 602** quantity by the following formula and mix it in 200 litres of RO /DM water permeate. pH is to be maintained not less than 2.0 or greater than 3.5.

If pH>2.5 add 50ml of **Aquazzol 602** and mix the contents thoroughly.

Check the pH. If pH is not attained repeat additions of 50 ml **Aquazzol 602** followed by thorough mixing till pH 2.5 is attained.

Quantity of **Aquazzol 602** = 1.5 kg per membrane.

Cleaning Operation

Circulation: 20 mins.

Soaking: 40 mins.

Drain the chemical solution and cleanings.

Flush the line with RO/DM Permeate water and check for neutral pH and clarity. If the pH is deviating from the range of 6.5 -7.2 give another flushing. If the water is turbid or colored even very slightly give another circulation for 10 mins. and flush again and check for pH and turbidity.

Note:

Normal duration of chemicals cleaning varies between 20 minutes to 60minutes and soaking duration varies from 40 minutes to 2 hours depending on the extent and intensity of fouling.