

Recommendations for Effective Membrane Cleaning

- Clean membranes on a regular basis or when differential pressure (DP), normalized permeate flow, salt passage or feed pressure changes by 10 – 15% from the design limits. Regular and careful membrane cleaning is necessary and should not shorten the membrane life.
- Organic Foulants:** clean with an alkaline surfactant such as PermaClean PC-67 or PermaClean PC-99 to break down and remove organic matter and biofilms. Acid flushing may follow this program, if necessary.

ii) Scale Deposits:

- Calcium carbonate, iron oxide and iron hydroxide; clean with a PermaClean low pH cleaner.
- Calcium sulfate, strontium sulfate, barium sulfate, calcium fluoride; clean with PermaClean PC- 33 at alkaline conditions.

**If there is uncertainty of the type of fouling, always start with an alkaline cleaning product.*

- Flow rates during cleaning, must be sufficient to remove foulants from the membrane element but not exceed manufacturer’s limits. Flow rate should not exceed the feed pressure and pressure drop (ΔP) limitations determined by the membrane element manufacturer. Typical flow rates for membrane cleaning are provided in the table below.

Element diameter (inches)	Feed flow rate per Pressure vessel, m ³ /hr	Feed flow rate per pressure vessel, gpm
2.5	0.7 - 1.2	3-5
4	1.8 - 2.3	8-10
6	3.6 - 4.5	16-20
8	6.8 - 9.1	30-40
8 (400 and 440 ft ² membrane surface area)	8.0 – 10.2	35-45

- The maximum recommended pressure drop during membrane cleaning of 8” membranes should not exceed 1.4 bar [20 psi] per element or 4.1 bar [60 psi] for a multi-element pressure vessel.
- A cleaning solution volume of 55 liters [14.5 gallons] is recommended per 8” x 40” membrane element; this excludes pipe work volumes. A minimum of 40 liters [10.5 gallons] of cleaning solution is advised for each membrane element.
- Where practicable, warm the cleaning solution to the highest temperature allowed by the membrane manufacturer. Typical cleaning solution temperatures should be 25 – 35 °C [77 – 95 °F] although some membrane elements can tolerate even higher temperatures.
- Soak the membranes in cleaning solution for a minimum of 15 minutes before recirculation. This procedure should be repeated regularly throughout the cleaning.
- Flush pipework, membranes and cleaning tank thoroughly with chlorine-free water between each cleaning cycle and when returning the plant to normal operation.
- When cleaning multi-staged plant, clean each stage individually.
- Don’t panic when the plant returns to service and operating conditions are not improved or are even worse than at the start of the cleaning. Many of the cleaners used *temporarily* affect the membrane or polysulphone support structure, and routine operation for 4-24 hours may be necessary to stabilize operating conditions.

Membrane Manufacturer’s recommendations should always be followed with respect to pH, temperature, pressure and flowrate.

All information contained in this brochure is based on laboratory and field trial data and is considered to be true and accurate. Since the conditions in which these products may be used are outside Ondeo Nalco control, we cannot warrant the results obtained