



DOW FILMTEC™ Membranes Cleaning and Sanitization: Cleaning Steps

Cleaning Steps

There are six steps in the cleaning of elements:

1. Make up cleaning solution.
2. Low-flow pumping. Pump mixed, preheated cleaning solution to the vessel at conditions of low flow rate (about half of that shown in Table 2) and low pressure to displace the process water. Use only enough pressure to compensate for the pressure drop from feed to concentrate. The pressure should be low enough that essentially no or little permeate is produced. A low pressure minimizes redeposition of dirt on the membrane. Dump the concentrate, as necessary, to prevent dilution of the cleaning solution.
3. Recycle. After the process water is displaced, cleaning solution will be present in the concentrate stream. Then recycle the concentrate and permeate to the cleaning solution tank and allow the temperature to stabilize. Measure the pH of the solution and adjust the pH if needed.
4. Soak. Turn the pump off and allow the elements to soak. Sometimes a soak period of about 1 hour is sufficient. For difficult fouling an extended soak period is beneficial; soak the elements overnight for 10-15 hours. To maintain a high temperature during an extended soak period, use a slow recirculation rate (about 10 percent of that shown in Table 2).
5. High-flow pumping. Feed the cleaning solution at the rates shown in Table 2 for 30-60 minutes. The high flow rate flushes out the foulants removed from the membrane surface by the cleaning. If the elements are heavily fouled, a flow rate which is 50 percent higher than shown in Table 2 may aid cleaning. At higher flow rates, excessive pressure drop may be a problem. The maximum recommended pressure drops are 15 psi per element or 50 psi per multi-element vessel, whichever value is more limiting. Please note that the 15 psi per element or the 50 psi per multi-element vessel should NOT be used as a cleaning criteria. Cleaning is recommended when the pressure drop increases 15%. Pressure drop above 50 psi in a single stage may cause significant membrane damage.
6. Flush out. RO permeate or deionized water is recommended for flushing out the cleaning solution. Prefiltered raw water or feed water should be avoided as its components may react with the cleaning solution: precipitation of foulants may occur in the membrane elements. The minimum flush out temperature is 20°C.

Table 2. Recommended feed flow rate per pressure vessel during high flow rate recycle

Feed pressure ¹		Element diameter inches	Feed flow rate per pressure vessel	
psig	bar		gpm	m ³ /h
20 - 60	1.5 - 4.0	2.5	3 - 5	0.7 - 1.2
20 - 60	1.5 - 4.0	4 ²	8 - 10	1.8 - 2.3
20 - 60	1.5 - 4.0	6	16 - 20	3.6 - 4.5
20 - 60	1.5 - 4.0	8	30 - 40	6.0 - 9.1
20 - 60	1.5 - 4.0	8 ³	35 - 45	8.0 - 10.2

¹ Dependent on number of elements in pressure vessel.

² 4-inch full fit elements should be cleaned at 12 - 14 gpm (2.7 - 3.2 m³/hr).

³ For full fit and 440 sq. ft. area elements.

DOW FILMTEC™ Membranes
For more information about DOW
FILMTEC membranes, call the Dow
Water & Process Solutions business:

North America: 1-800-447-4369
Latin America: (+55) 11-5188-9222
Europe: (+32) 3-450-2240
Pacific: +60 3 7958 3392
Japan: +813 5460 2100
China: +86 21 2301 9000

<http://www.dowwaterandprocess.com>

Warning: Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

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