



# FILMTEC Membranes

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## Loading Procedures for FILMTEC Elements

This bulletin provides guidelines for loading or unloading FILMTEC® reverse osmosis (RO) and nanofiltration (NF) elements. You should also use a drawing supplied by the manufacturer of your pressure vessels as a reference when assembling or disassembling the end cap assemblies.

### Loading RO or NF Elements

1. Remove all end cap assemblies and thrust rings (if provided) from all pressure vessels in the train or system.

*Note:* There are several manufacturers of pressure vessels used for spiral wound nanofiltration and reverse osmosis elements. Refer to the manufacturer's drawing for your pressure vessel during disassembling and assembling of end cap assembly.

2. Spray clean water through the open pressure vessels to remove any dust or debris present in the vessels.

*Note:* If additional cleaning is required, create a swab large enough to fill the inside diameter of the pressure vessel. Soak the swab in a glycerin/water solution (50 percent by volume) and move it back and forth through the pressure vessel until the vessel is clean and lubricated.

3. Place the leading end of the first RO or NF element into the feedwater end of the first pressure vessel and slide it in approximately one-half of the element length.

*Note:* Always load NF or RO elements into the feedwater end of the pressure vessel.

4. Verify the chevron seal (i.e., brine seal) is properly seated in the groove on the trailing end (feed end) of the element, in such a way that the brine seal opens in the upstream direction. Then install the interconnector into the product water tube (PWT) of the element. Prior to installation of the interconnector, lubricate the o-ring seals on the interconnector with a very thin layer of silicon-base o-ring lubricant.

*Note:* FilmTec Corporation recommends using Dow Corning 111 as the lubricant for interconnector and adapter o-rings. This product has been FDA listed. If a silicon-base lubricant is not acceptable, then glycerin may be utilized.

5. Lift the next NF or RO element into position and install the leading end on the interconnector. Be very careful to hold the next element so that the weight is not supported by the interconnector, and push the element into the pressure vessel until about one-half of the element extends outside the vessel.
6. Repeat steps 4 and 5 until all elements are loaded into the pressure vessels. The number of elements loaded into an individual vessel will depend on the length of the elements and of the pressure vessel.
7. Install the thrust ring in the concentrate discharge end of the pressure vessel. Consult the manufacturer's drawing for specific information on thrust ring positioning.

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## FILMTEC Membranes

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8. Install end cap assemblies on each end of the pressure vessel, as follows:

- a) Carefully position the downstream end cap assembly in the pressure vessel and push the end cap assembly as a unit squarely into the end of the element. Use care when seating the o-ring seal on the adapter into the element and avoid pinching or rolling o-rings.
- b) Rotate the end cap assembly to ensure proper alignment with the connecting piping.
- c) Replace the hardware sealing the end cap assembly in place. Refer to the pressure vessel manufacturer's drawing.
- d) Push the NF or RO element stack from the feed (upstream) end towards the downstream side.
- e) Before closing the feed end of the pressure vessel, it may be advisable to shim the vessel to take up any free space between elements and the end cap assembly. This procedure helps to prevent movement and hammering of elements when the system starts and shuts down. Please refer to instructions on Shimming for additional detail.
- f) Repeat steps a through e for each pressure vessel in the train or system.

9. Replace any piping that was removed in order to load elements to the same location from which they were removed.

### NF or RO Element Removal

Two operators are recommended when removing NF or RO elements from a train or system. Remove the element from each pressure vessel as follows:

1. Disconnect the hard plumbing at each end of the pressure vessel. Refer to the vessel manufacturer's drawing as required. Mark or tag all removed items for return to the same location.
2. Remove the end cap assemblies from each end of the pressure vessel.
3. Push the NF or RO elements from the pressure vessel in the same direction as feedwater flows. Push the elements out one at a time. Support each element as it is being pushed out of the vessel until the element is free of the pressure vessel.

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Published June 2000.

