

## MILLENIUM MEMBRANE REPLACEMENT

### Tools and Materials Required

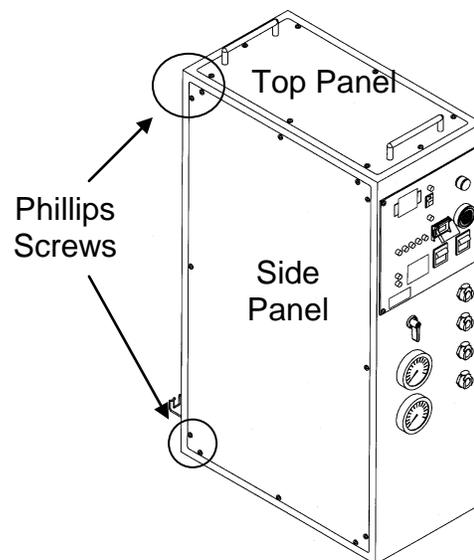
- Screwdriver (flat & Phillips)
- ¼" or 3/8" drive ratchet wrench
- 7/16" socket (thin-wall)
- 8 to 10" extension
- New o-rings and seals
- New fittings (optional)
- Minncare® HD Disinfectant
- Silicone Lubricant

### Initial Preparation

1. Turn off Millenium.
2. Turn off water supply at source.
3. Briefly turn ON the Inlet Water Valve switch. Allow system (including, if present, carbon tank(s), softener, pre-filter housing, etc.) to fully depressurize.
4. Disconnect water lines: Product, Feed and Waste.
5. Unplug power cord.

**WARNING:** Ensure power cord is disconnected to prevent risk of electric shock, which could result in injury or death.

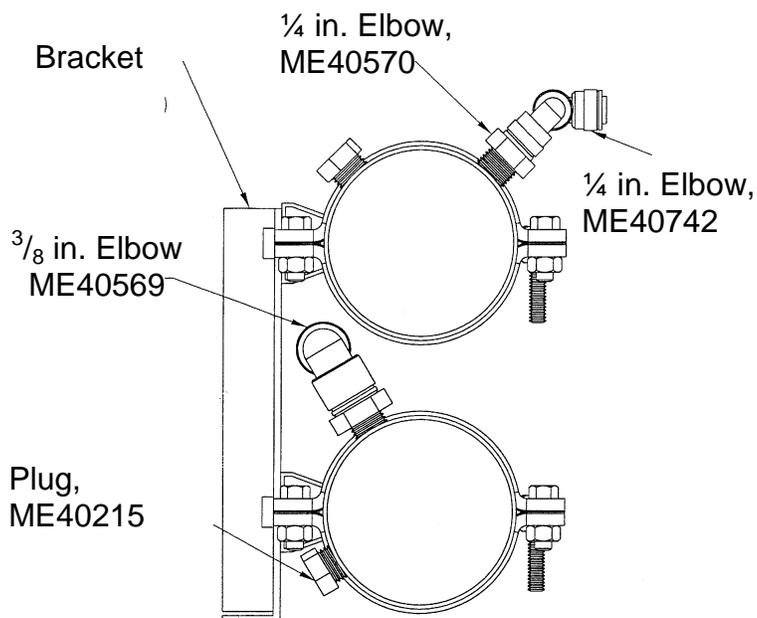
6. Remove Millenium from cart.
7. Using a Phillips screwdriver, remove the small screws that secure the side panel to the enclosure.
8. Remove the top panel by removing the screws that secure it to the top of the enclosure.



## MEMBRANE REPLACEMENT PROCEDURE

### OPTION 1 – CHANGE MEMBRANES WITHOUT REPLACING O-RINGS

9. Locate the two cylindrical stainless steel membrane housings.
10. Remove the white 3/8 inch tubes from the elbow fitting on each housing.
11. Remove the green 1/4 inch tubes from the elbow fitting on each housing.
12. Using a felt-tip marker, mark both the SS cylinder and the plastic end-cap with a vertical line to facilitate proper positioning at re-assembly.



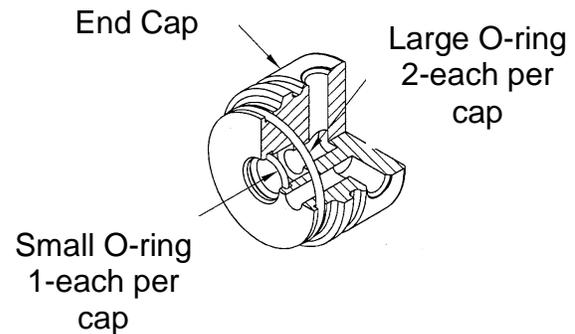
13. Remove the two bolt/nut assemblies that secure the two halves of the circular metal clamp to the plastic end cap. Remove the clamp and retain all parts for reassembly.

**NOTE:** Early membrane housings utilize a U-pin retainer device for the end caps. Remove the cotter pin, and then withdraw the U-pin to allow end cap removal.

14. Pull the end cap out of the housing using a twisting motion and retain the end cap for re-use.
15. Using pliers, gently grasp the end nipple of the membrane element and pull straight up to remove the membrane from the housing. Repeat for the second housing and discard both membranes.
16. Remove the new membranes from protective bags. Record the part number and lot number data for documentation purposes.
17. Identify the “brine seal” (black rubber seal) on one end of each membrane.

18. Insert the membrane(s) into the housing with the brine seal at the top end of housing. Push membrane(s) fully into housing to seat the lower nipple into the socket on bottom end cap.

19. Inspect the O-rings on the upper end cap (one internal, one external) looking for defects such as cracks, splits or debris. Clean, repair or replace as appropriate. A very light coating of silicone lubricant may be applied if necessary.



20. Push the end cap into place with a twisting motion and align the vertical marks from step 12 above.

21. Re-fit the circular clamp and tighten the nuts/bolts to secure the end cap.

22. Re-install the white and green tubes in the correct elbows.

23. Restore the feed water, electrical power, product outlet hose and waste hose connections to Millenium RO unit.

24. Route the product water hose and waste water hose to drain.

25. Turn ON the source water and then turn ON the Water Inlet Valve switch. Observe the drain hose to confirm flow.

26. Inspect membrane housings for leaks around the end cap or tube fittings and repair as necessary.

27. Turn ON RO Pump Power. Pump pressure should increase to approximately 190 psi.

28. Inspect again for leaks and repair as necessary.

29. When the RO is leak free, allow RO unit to run at normal pressures and flow for three hours with product flow going to drain.

30. Verify product and waste flows, % rejection, and product water TDS are all within specification (reference the Millenium Operation & Maintenance manual as needed).

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If the % rejection is low (below specification) and/or the product water TDS is high, there may be a problem with one or both membranes (defective), or a problem with one or both housings (O-ring failure, brine seal failure). Perform **MILLENNIUM MEMBRANE EVALUATION** procedure and repair as needed.

31. Disinfect the RO machine as discussed in Section 4.4 of the Millenium Operation and Maintenance Manual.

**NOTE:** There may be a considerable time lag (days to weeks) between drawing the AAMI sample and receiving the results. The Millenium RO unit must be operated daily for a minimum of 60 minutes per 24 hour period to minimize stagnation and resultant bacterial growth.

32. Draw samples of product water and submit for AAMI testing.
33. Draw sample of the product water for bacteria and LAL testing (colony count and endotoxin level) and submit to lab. Reference the Millenium Operation and Maintenance Manual Section 4.5 for details.
34. Once satisfactory colony count and endotoxin test results are confirmed, the Millenium RO unit may be returned to normal service.

## **OPTION 2 - CHANGE MEMBRANES AND INSTALL NEW O-RINGS IN UPPER & LOWER END CAPS**

1. Perform Initial Preparation as outlined in steps 1-8 above.
2. Locate the two cylindrical stainless steel membrane housings.
3. Remove the green and white tubes from both upper end caps.
4. Remove the white tubes from both lower end caps.
5. Disconnect all tubes that connect directly to the membrane housings, as well as, tubes that connect between the machine housings.
6. Using a ratchet wrench w/extension and 7/16 inch socket, locate and remove the nuts, which secure the upper and lower membrane housing brackets to the inside of the machine case. Support the membrane housing assembly as it is being removed to avoid dropping it and subsequent damage. Retain all parts removed for re-assembly.
7. Remove the entire membrane housing assembly from the cabinet.

**NOTE:** If needed, make a sketch of the tube and hose routings to facilitate reassembly.

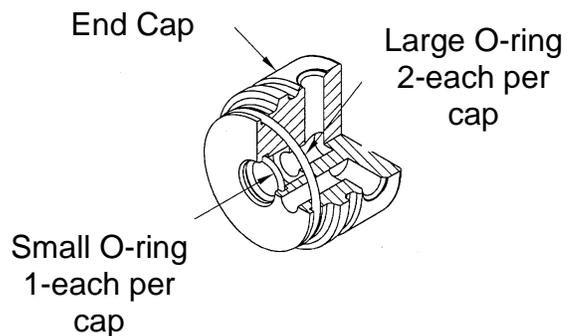
**NOTE:** The end caps and membranes may be removed without removing the housings from the bracket.

8. Follow steps 12-14 above (OPTION 1) to remove the upper end cap.

9. Repeat for the lower end cap.

10. Remove the inner and outer O-rings from both caps.

11. Replace the inner and outer O-rings with new o-rings. New seals may be lubricated with a very light coating of silicone lubricant.



**NOTE:** Do not apply excessive quantities of the lubricant. A very light coating will suffice.

12. Follow steps 15-21 above (OPTION 1) to re-assemble housing with the new membrane(s).

13. Re-install the Membrane Housing Assembly into the cabinet and secure the brackets to the cabinet mounting studs with nuts removed in step 7 above.

14. Re-install all the tubing and hoses removed in steps 3, 4 & 5.

15. Follow steps 23-35 above (OPTION 1) to complete repair.

16. Prepare for leak testing, restore water and power connections and then reference:

## Tech Note 207: MILLENIUM START-UP PROCEDURE

## Membrane & O-Ring Part Number (P/N) Guide.

<b>MACHINE P/N*</b>	<b>MEMBRANE</b>	<b>LARGE O-RING</b>	<b>SMALL O-RING</b>
<b>14714</b>	ME14647	OS1151581	OS1151580
<b>1229556</b>	1231667	OS1151581	OS1151580
<b>1232429</b>	OS1228070	OS1151581	OS1151580
<b>3028136</b>	OS1228070	OS1151581	OS1151580

\* - Machine P/N is shown on the white or silver label on the back of the machine