

Membrane Failure and Warrantee Replacement

The difficult problem with a warrantee request is proving to the manufacturer that failure was due to a membrane quality problem. Their attitude is that, if the membrane worked initially after installation, membrane failure must be due to other system or operator causes. They almost always respond that it worked for some time. So the burden of proof is on us. Had the customer installed the membrane and found that it failed immediately, it would be easier to argue substandard product.

Summary of major causes of membrane failure:

1. Too Little Waste - Waste or reject is required to clean contaminants from the membrane surface. All membrane manufacturer spec sheets are based on a 15% recovery rate, or 85% waste (reject). Most actual installations waste 66%, or 2 parts reject to 1 part product. However, if two membranes are run in series (waste from the first is used as feed into the second), then a ratio 50% waste to 50% product is often considered acceptable. That is, total product from both membranes equals total waste from second membrane. To waste less than 50% on a small commercial RO installation would cause fouling.

2. Too high pressure. On low-pressure membranes like the FilmTec XLE, LE, or LP series, care must be taken to keep a lid on the pressure. The XLE membrane's pressure should not exceed 150 psi. The LE & LP membranes should not exceed 160 psi. These membranes are so efficient that exceeding these upper limits cause the membrane to produce so much water that there is not enough water left to clean the membrane flushing the contaminants down the drain. Higher pressure shortens membrane life. Note: the TW & BW membranes have a rated pressure of 225 psi.

3. Chlorinated water on the membrane. One or two parts per million over a period of two months will begin to dissolve the membrane material. TDS begins to rise.

4. Water that is not softened.. Hardness of 17 grains on a home system without a pump has a negligible effect on a membrane. However 2 grains of hardness on a commercial system accumulates quickly. A membrane could

be fouled very fast. With enough hardness, fouling could occur in a day.

It should be noted that some operators have found that hardness can be easily cleaned from small commercial membranes by taking the membrane off line, standing the housing up on end, draining out the water, plugging up the bottom holes, and pouring in muriatic acid and letting it set for 10 minutes. Flush & reinstall. Note: the muriatic acid is the same kind sold by Home Depot for cleaning concrete - normally a 30% solution sold in a gallon jug.

5. Carbon dust. When you change your carbon pre-treatment, first flush the carbon to drain or protect you membrane from the carbon fines with a good sediment filter after the carbon. Carbon dust can foul a membrane in two seconds. No way to clean this.

6. Pump too small. For example: If you have a membrane like a TW30-2540 that needs 800 gpd for product and 1600 gpd for waste, your pump should be rated at 2400 gpd or 100 gallons per hour. What happens when a 50 gallon per hour pump is used? Fouling! Not enough water is available to flush the membrane properly. (Often the operator turns the waste flow control tighter to raise the pressure in order to make more water. Fouling continues, production falls, TDS rises. Waste TDS rises. Production falls further.)

If you experience membrane failure, a new membrane will not solve any of the above problems. The RO system must be properly configured for any new membrane to properly produce and last. Otherwise you can expect sudden membrane failure (SMF).