



Cleaning and Sanitization

Sanitizing RO & NF Membrane Systems

Heat Sanitization

The HSRO series of FilmTec™ Elements can be sanitized with hot water. It is an excellent choice for food and pharmaceutical applications. The advantages of hot water as a sanitization agent are:

- May reach areas chemicals do not (dead legs, etc.)
- Easy to validate
 - Simpler to monitor heat than chemical concentrations
 - Easier to demonstrate complete distribution of heat
- No need to rinse out chemicals
- No need to store chemicals
- Minimizes waste disposal issues
- No need to approve chemicals

Before pre-conditioning, membranes will operate at reduced feed pressure and salt rejection. New HSRO heat-sanitizable spiral elements must be pre-conditioned prior to initial use by exposure to hot water, to perform to specifications. Suitable quality water must be used during all pre-conditioning steps. This water is chlorine-free, non-scaling/fouling water. RO permeate is preferred, but pre-filtered feedwater may be used. An appropriate conditioning procedure consists of the following:

1. Flush to drain with suitable quality water (for ~30 min) at low pressure and low permeate flowrate.
2. Recycle warm water until the system warm up (45°C or less) at very low pressure (< 25 psig (1.7 bar) trans-membrane pressure with a maximum feed pressure of 45 psig (3 bar)). Maximum pressure drop through a single element is 1.5 psig (0.1 bar).
3. Introduce hot water to the system to increase temperature to 80°C (176°F). Ramp temperature up at a rate no faster than 1-2 °C/min (max 4°C/min).
4. Keep trans-membrane pressure below 25 psig (1.7 bar) when warm or hot water (45°C or higher) is being fed to the membranes.
5. Maintain temperature for 60 – 90 minutes.
6. Allow system to cool to 45°C or below. Ramp temperature down at a rate no faster than 1-2 °C/min (max 4°C/min).
7. Flush to drain with suitable water quality (for ~30 min) at very low pressure (< 25 psig (1.7 bar) trans-membrane pressure with maximum feed pressure of 45 psig (3 bar)).

Note: DO NOT recycle permeate during the FIRST heat-setting process (pre-conditioning) from step 2 to 6. In case the system does not allow to drain permeate during heating process, please contact your DuPont representative for further information and alternatives.

Note: DO NOT start-up a second pass RO before the first pass RO has been pre-conditioned.

Heat Sanitization (Cont.)

The procedure for regular sanitization may be the same as described above, in this case both concentrate and permeate may be recycled.

HSRO membranes have high water permeability before they have been pre-conditioned. After pre-conditioning, they attain their specified flow and salt rejection performance during operation at normal temperature. The performance will remain stable irrespective of subsequent additional sanitization cycles. The procedure for regular sanitization may be the same as described above, but ultimately is the responsibility of the end-user. Certain industries have required sanitizing procedures that may be different from our procedures.

Excerpt from [FilmTec™ Reverse Osmosis Membranes Technical Manual](#) (Form No. 45-D01504-en), Chapter 6, "Cleaning and Sanitization."

Have a question? Contact us at:

www.dupont.com/water/contact-us

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