



Water Chemistry and Pretreatment

Fouling Prevention

Prevention of Aluminum Fouling

Sources of aluminum fouling are:

- Flocs carry-over from a pretreatment process using aluminum based flocculants
- Post-precipitation of aluminum flocculants due to poor pH control
- Reaction of aluminum with silica, forming aluminum silicates
- Natural mineral silt and colloidal aluminum silicates

Aluminum silicate fouling can be found in the first and last stage of RO/NF plants. Even small aluminum concentrations (like 50 ppb) may result in a performance decline due to several factors:

1. Aluminum reacts with silica. Low silica concentrations (10 mg/L) can result in aluminum silicate fouling. The use of aluminum based products in the pretreatment increases the risk of aluminum fouling significantly. Therefore, the use of aluminum based products is not recommended. Iron based products are recommended instead.
2. The solubility of the aluminum is lowest at pH 6.5. This is the pH at which the flocculation should be run. The RO/NF system should be operated preferably at pH 7 – 9 (dependent on the water analysis since calcium carbonate scaling should be avoided) to keep aluminum in solution.
3. Antiscalants containing polymers (like acrylic acid based products) are sensitive to the presence of metals like iron and aluminum. It is important to select the right antiscalant. Otherwise, the antiscalant is deactivated (poisoned) and subsequently scaling and antiscalant fouling may occur in the membrane. In addition, the antiscalant fouling can act as a nutrient for microorganisms and biofouling will occur.
4. Fine clay/sand particles. It is recommended to remove clay and sand particles in the pretreatment by either multimedia filtration, ultrafiltration or microfiltration. It may be necessary to use coagulants in order to form larger particles that can be removed by the subsequent filtration process.

To minimize aluminum fouling, it is recommended to keep aluminum in the feedwater below 0.05 mg/L.

Excerpt from [FilmTec™ Reverse Osmosis Membranes Technical Manual](#) (Form No. 45-D01504-en), Chapter 2, "Water Chemistry and Pretreatment."

Have a question? Contact us at:

www.dupont.com/water/contact-us

All information set forth herein is for informational purposes only. This information is general information and may differ from that based on actual conditions. Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where DuPont is represented. The claims made may not have been approved for use in all countries. Please note that physical properties may vary depending on certain conditions and while operating conditions stated in this document are intended to lengthen product lifespan and/or improve product performance, it will ultimately depend on actual circumstances and is in no event a guarantee of achieving any specific results. DuPont assumes no obligation or liability for the information in this document. References to "DuPont" or the "Company" mean the DuPont legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED. No freedom from infringement of any patent or trademark owned by DuPont or others is to be inferred.

© 2022 DuPont. DuPont™, the DuPont Oval Logo, and all trademarks and service marks denoted with ™, SM or ® are owned by affiliates of DuPont de Nemours Inc., unless otherwise noted.

