3-8. Organic Fouling Prevention

Adsorption of organic substances on the membrane surface causes flux loss. Sometimes the adsorption is irreversible when the organic substances are hydrophobic or positively charged polymers with high molecular weight. Such organic substances including organics present as an emulsion must be removed in the pretreatment.

Organics occurring in natural waters are usually humic substances in concentrations between 0.5 and 20 mg/L TOC. Pretreatment should be considered when TOC exceeds 3 mg/L. Humic substances can be removed by a coagulation process with hydroxide flocs or by ultrafiltration or by adsorption on activated carbon.

Oils (hydrocarbon or silicon-based) and greases contaminating the RO feed water at levels above 0.1mg/L should be removed by coagulation or activated carbon. Once the membranes are fouled by oils and greases, they can be cleaned off with alkaline cleaning agents if the flux has not declined by more than 15%.

Trihalomethane (THM)

THMs (e.g. chloroform) are produced from a chemical reaction between free chlorine and trace organics. THMs are considered potentially carcinogenic, so are a concern when found in drinking water. And also trace THMs can be a major concern in the semiconductor industry, if present in feed water.

About 90% of THMs can be rejected by RO membranes. Activated carbon can also adsorb THMs well. A complete removal of THMs is possible by using both activated carbon and RO membranes.