



## FILMTEC Membranes

### Cleaning and Sanitization: Cleaning Chemicals

#### Cleaning Chemicals

Table 1 lists suitable cleaning chemicals. Acid cleaners and alkaline cleaners are the standard cleaning chemicals. Acid cleaners are used to remove inorganic precipitates (including iron), while alkaline cleaners are used to remove organic fouling (including biological matter). Sulfuric acid should not be used for cleaning because of the risk of calcium sulfate precipitation. Specialty cleaning chemicals may be used in cases of severe fouling or unique cleaning requirements. Preferably, RO/NF permeate should be used for the preparation cleaning solutions, however, prefiltered raw water may be used. The feed water can be highly buffered, so more acid or hydroxide may be needed with feed water to reach the desired pH level, which is about 2 for acid cleaning and about 12 for alkaline cleaning.

**Table 1. Simple cleaning solutions**

Cleaner	0.1% (W) NaOH and pH 12, 35°C max. or 1.0% (W) Na <sub>4</sub> EDTA and pH 12, 35°C max.	0.1% (W) NaOH and pH 12, 35°C max. or 0.025% (W) Na-DSS and pH 12, 35°C max.	0.2% (W) HCl, 25°C and pH 1 - 2	1.0% (W) Na <sub>2</sub> S <sub>2</sub> O <sub>4</sub> , 25°C and pH 5	0.5% (W) H <sub>3</sub> PO <sub>4</sub> , 25 °C and pH 1 - 2	1.0% (W) NH <sub>2</sub> SO <sub>3</sub> H, 25°C and pH 3 - 4
<b>Foulant</b>						
Inorganic Salts (for example, CaCO <sub>3</sub> )			Preferred	Alternative	Alternative	
Sulfate Scales (CaSO <sub>4</sub> , BaSO <sub>4</sub> )	OK					
Metal Oxides (for example, iron)				Preferred	Alternative	Alternative
Inorganic Colloids (silt)		Preferred				
Silica	Alternative	Preferred				
Biofilms	Alternative	Preferred				
Organic	Alternative	Preferred				

The temperatures and pH listed in Table 1 are applicable for BW30, BW30LE, LE, XLE, TW30, TW30HP, SW30HR, SW30HR LE, SW30XLE, SW30 and NF90 membrane elements. For more information regarding the allowed temperatures and pH for cleaning, please refer to [Table 6.1](#).

#### Notes:

- (W) denotes weight percent of active ingredient.
- Foulant chemical symbols in order used: CaCO<sub>3</sub> is calcium carbonate; CaSO<sub>4</sub> is calcium sulfate; BaSO<sub>4</sub> is barium sulfate.
- Cleaning chemical symbols in order used: NaOH is sodium hydroxide; Na<sub>4</sub>EDTA is the tetra-sodium salt of ethylene diamine tetraacetic acid and is available from The Dow Chemical Company under the trademark VERSENE\* 100 and VERSENE 220 crystals; Na-DSS is sodium salt of dodecylsulfate; Sodium Laurel Sulfate; HCl is hydrochloric acid (Muratic Acid); H<sub>3</sub>PO<sub>4</sub> is phosphoric acid; NH<sub>2</sub>SO<sub>3</sub>H is sulfamic acid; Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub> is sodium hydrosulfite.
- For effective sulfate scale cleaning, the condition must be caught and treated early. Adding NaCl to the cleaning solution of NaOH and Na<sub>4</sub>EDTA may help as sulfate solubility increases with increasing salinity. Successful cleaning of sulfate scales older than 1 week is doubtful.
- Citric Acid is another cleaning alternative for metal oxides and calcium carbonate scale. It is less effective. It may contribute to biofouling especially when it is not properly rinsed out.

**FILMTEC™ Membranes**  
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