Pre-Startup Cleaning Procedure for RO & NF Spiral Elements

The following cleaning procedure must be performed prior to initial use of elements and whenever system has been inoperative for more than four (4) hours. This procedure will remove storage solution and condition membranes for production. Failure to follow this recommendation may lead to poor performance and will void element warranty. Please refer to the Kovalus Separation Solutions™ Water Quality Guidelines on the reverse side of this document.

PRE-STARTUP CLEANING PROCEDURE				
Step 1	**Flush Cycle:**	**Neutral pH**	**122ºF (50ºC)**	**10 min.**
	Flush system with clean, soft water (122°F/50°C) using minimum three times system hold-up volume, sending concentrate and permeate to drain.			
Step 2	**Alkaline Cycle:**	**pH 10.0-10.5**	**122°F (50ºC)**	**20 min.**
	Fill system with clean, soft water (122°F/50°C). Add to circulating water: • KOVKLEEN® 222 Cleaner (or KOVKLEEN WA Cleaner in Europe) to adjust pH to 10.0-10.5 Circulate CIP solution at standard pressure and flow conditions for 20 minutes.			
Step 3	**Flush Cycle:**	**Neutral pH**	**122ºF (50ºC)**	**10 min.**
	Flush system with clean, soft water (122°F/50°C) using minimum three times system hold-up volume, sending concentrate and permeate to drain.			
Step 4	**Acid Cycle *(NF Only)*:**	**pH 3.5-4.0**	**122°F (50ºC)**	**20 min.**
	Fill system with clean, soft water (122°F/50°C). Add to circulating water: • KOVKLEEN 100 Cleaner to adjust pH to 3.5-4.0 Circulate CIP solution at standard pressure and flow conditions for 20 minutes.			
Step 5	**Flush Cycle *(NF Only)*:**	**Neutral pH**	**122ºF (50ºC)**	**10 min.**
	Flush system with clean, soft water (122°F/50°C) using minimum three times system hold-up volume, sending concentrate and permeate to drain.			
Step 6	**Water Flux:**	**Neutral pH**	**122ºF (50ºC)**	**10 min.**
	Record water flux value of new membranes using procedure outlined in your operating manual. This value will serve as a baseline measurement for subsequent cleanings.			

For technical assistance, please contact a Cleaning Specialist at +1-978-694-7050.
To place an order, please contact our Customer Service Department at +1-978-694-7000.

Note: If KOVKLEEN cleaners are not readily available, please contact KSS.

Kovalus Separation Solutions™
Water Quality Guidelines for Cleaning and Diafiltration

For All Polymeric Membrane and Ion Exchange/Adsorbent Resin Applications

Parameter	MF/UF	NF/RO & IE/Ads. Resin
Turbidity	< 1.0 NTU	< 1.0 NTU
Suspended Solids (see Note 1)	< 5 mg/l	< 1 mg/l
Calcium (Ca)	< 10 mg/l	< 5 mg/l
Total Hardness (as $CaCO_3$)	< 60 mg/l	< 30 mg/l
Iron (Fe)	< 0.05 mg/l	< 0.05 mg/l
Zinc (Zn)	< 0.3 mg/l	< 0.05 mg/l
Copper (Cu)	< 0.1 mg/l	< 0.05 mg/l
Manganese (Mn)	< 0.05 mg/l	< 0.02 mg/l
Aluminum (Al)	< 0.05 mg/l	< 0.05 mg/l
Silica, Reactive (as SiO_2)	< 10 mg/l	< 10 mg/l
Silica, Colloidal (as SiO_2)	< 1 mg/l	< 0.1 mg/l
Silicone	0 mg/l	0 mg/l
Total Bacteria Count (TBC)	< 1000 per ml	< 1000 per ml
E-Coli Count	0 per 100 ml	0 per 100 ml
Chlorine (as NaOCl)	< 1 mg/l	0 mg/l
D-Limonene (citrus applications only)	< 5 mg/l	0 mg/l
Fats, Oils and Grease	0 mg/l	0 mg/l
Total Organic Carbon (TOC)	< 1 mg/l	< 1 mg/l
pH (standard units)	6.5 – 7.5	6.5 – 7.5

TABLE NOTES

1 The water supply must be free from particulate matter such as rust, scale, flakes, sandy and granular material, slurries, scum, algae and any chemical constituents that could foul or damage the membranes.

2 The water pH may need to be adjusted with acid or alkali depending on application and local conditions.

3 KSS membranes are available in many configurations and materials that may be affected differently by various water constituents. Softened water or evaporator condensate is generally acceptable for cleaning and flushing of polymeric membranes. Please consult with the KSS Process Group for the particular membrane in question.

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