

Technical Information

401

GENERAL PROCEDURE ON MEMBRANE CLEANING

The BKG Water Solutions Osmotech™ product range covers Membrane Cleaners suitable for most membranes on the market.

Frequently membrane cleaning is necessary to:

- maximize the production output of the membrane plant
- avoid irreversible scaling and fouling on the membrane
- prolong the life of the membrane
- ensure the best possible permeate quality
- minimize the energy costs
- minimize the overall process cost of the membrane production

General overview on the most appropriate Membrane Cleaner

The best cleaning method for membranes depends on the type of the membrane, the nature of the deposit, and the material of the deposit.

The cleaner is selected according to the membrane type and to the deposits on it. It should be taking into account that pH variations may cause the formation of precipitate within the feed water.

Contamination	Type of Membrane Cleaner	Product
Inorganic	Acidic Cleaner	Osmotech 2101 Osmotech 2173 Osmotech 2575
Organic	Alkaline Cleaner	Osmotech 2202 Osmotech 2230 Osmotech 2610 Osmotech 2691
Organic and inorganic	1 st step - Alkaline Membrane Cleaner 2 nd step - Acidic Membrane Cleaner	⇒ Alkaline Cleaner ⇒ Acidic Cleaner
Biological and organic	Enzymatic cleaning	Osmotech 2253

(To avoid any damage to the membrane by the membrane cleaner, please refer to the plant /membrane supplier's manual to establish the minimum and maximum permissible pH and temperature limits for the membrane)

General steps of Membrane Cleaning

For the first cleaning sequence, it is recommended that a Membrane Cleaner in the same pH range as that of the feed be used. This is essential if precipitation from the feed is expected due to pH variations. In other words, if the filtrated feed is alkaline, an alkaline cleaner should be used at first and vice versa.

In general, the Membrane Cleaning is most efficient at the highest permitted feed velocity and without permeate pressure. In the following table, the general sequences are summarized.

General steps for Membrane cleaning			
Step	Temperature	Time	Remark
Interruption of the filtration process			
Flushing with tap water *	Room temperature or higher	up to 15 min	Very important to avoid reactions with the membrane cleaner in the next step
1 st Cleaning (acidic or alkaline)	30 – 60 °C (as high as possible)	15 to 60 min	Can be prolonged if the circulation pump alone provides the heating
Flushing with tap water	Room temperature or higher	up to 15 min	Carry out with care to avoid any later reactions
Flux control			
2 nd Cleaning if necessary (acidic or alkaline)	30 – 60 °C as high as possible	15 to 60 min	Can be prolonged if the circulation pump alone provides the heating
Flushing with tap water	Room temperature or higher	up to 15 min	
Flux control			
<p>*Silicate containing feed: If the feed contains a high amount of silicates, a direct alkaline cleaner is recommended to avoid irreversible precipitations on the membrane. The membrane should not be flushed with tap water beforehand. The pH of the cleaner has to be above 11 and has to be maintained so during the cleaning period. Osmotech 2202 is particularly suitable for this application.</p>			

Clean-up procedure on membranes for water purification

In water purification plants, the first cleaning step should be done with an Alkaline Cleaner to remove the organic fouling and scaling first. Having removed the organic deposits on the membrane, acidic cleaning is more efficient in removing non-organic scaling if necessary. If this step is not sufficient, a second cleaning with an acidic product is the most efficient way to remove non-organic scaling. In any case, acidic cleaning should be used from time to time as it eliminates water hardness residues.



The following table shows the general cleaning-up procedure on membranes for water purification.

General cleaning-up steps on membranes for water purification			
Step	Temperature	Time	Remark
Interruption of the filtration process			
1 st alkaline Cleaning	30 – 60 °C as high as possible	15 to 60 min	Can be prolonged if the circulation pump alone provides the heating
Flushing with water	Room temperature or higher	up to 15 min	
Flux control			If the flux is on the regular level, quality control of the permeate is recommended before usage. If the flux is still on a low level, a 2 nd alkaline cleaning may be required.
2 nd / 3 rd acidic cleaning if necessary	30 – 60 °C as high as possible	15 to 60 min	Can be prolonged if the circulation pump alone provides the heating
Flushing with water	Room temperature or higher	up to 15 min	
Flux control			If the flux is on the regular level, quality control of the permeate is recommended before usage

Preserving of biological growing during interruption of the production

During the shot down of the production, it is recommended to avoid biological growing inside the plant. Before the shot down, the plant has to be cleaned first. After the cleaning, Ferrocid 8583 should be added to the fill-up water.

	powder /liquid	Concentration (g/m ³)	pH-value (1% in demi. Water)	ceramic	organic
Ferrocid 8583	L	10 - 100	5,5	√	√

√ = suitable on membrane

Membrane Cleaner Selection Table

The following table shows the characteristics of the Osmotech™ membrane cleaner and the range of applications.

Characteristics of membrane cleaner										
				Membrane type		Scaling non-organic		Organic		
		powder /liquid	pH-value (1% in demi. Water)	ceramic	organic	Metal - hydroxide / salts	carbonate	mineral and synthetic oils	Grease, oil, fats	biological
Acidic Cleaner										
Osmotech	2101	L	2,4	•	•	√	√	√		
Osmotech	2173	L	2,3	•	•	√	√	√		
Osmotech	2575	L	1,3	•	o	√√	√√	√		
Alkaline Cleaner										
Osmotech	2202	L	11,5	•	•	√	√	√	√	√
Osmotech	2230	P	11,7	•	o	√	√	√	√√	√√
Osmotech	2610	P	12,4	•	o	√	√	√	√√	√
Osmotech	2691	L	12,6	•	o	√	√	√	√√	√√
Enzymatic Cleaner										
Osmotech	2253	P	9,3	•	•			√	√	√√

• = suitable ; o = partly suitable depending on the permitted pH-Value of the membrane; √ = suitable for weak contamination; √√ = suitable for strong contamination

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