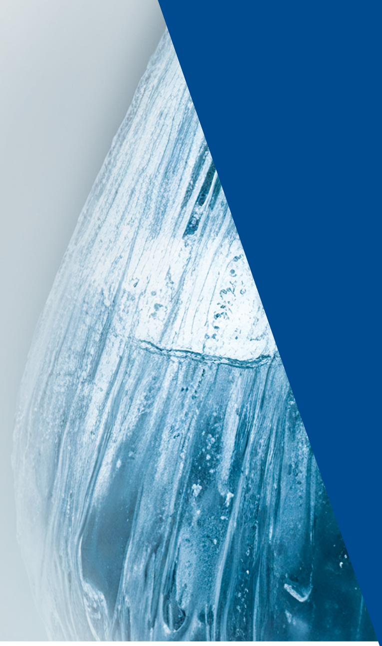
FORBLUE™
SELEMION

CREATION THROUGH SEPARATION

AGC

Ion-Exchange Membranes



An ion-exchange membrane is a sheet made of polymer materials that include an ion-exchange functional group to selectively allow the flow of ions through the membrane. Although many types of ion-exchange membranes are now available, membranes are basically classified into two categories: anion-exchange membranes and cation-exchange membranes. The membrane takes its name from the ions that it allows to pass through it. Thus a cation-exchange membrane uses a negatively charged functional group to allow the passage of only positively charged cations.

SELEMION is a hydrocarbon type ion-exchange membrane available in nine different grades optimized for a variety of applications. These membranes allow the separation of ionic solutions via DC current or concentration gradients. In addition to supplying SELEMION membranes, AGC also provides custom dialyzer equipment. AGC offers membrane manufacturing, process design, stack assembly, and engineering and maintenance support for SELEMION applications through our AGEC (AGC Engineering Company) office.

Contact the AGC team today to discuss a SELEMION solution for your needs.

SELEMION Reference Data

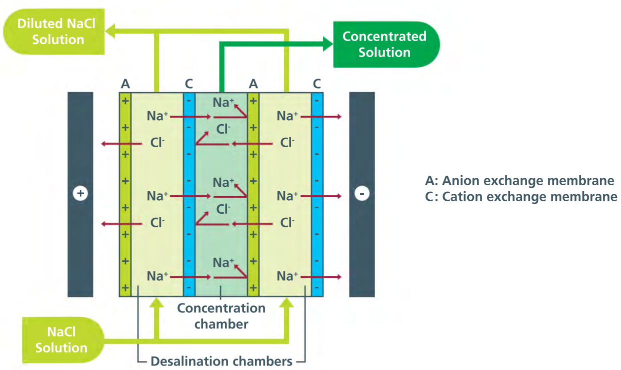
Type			General Purpose				Special Purpose			
			Cation Exchange Membrane		Anion Exchange Membrane		Cation Exchange Membrane	Anion Exchange Membrane		
Product Name			CMVN	CMTE	AMVN	DSVN	HSFN	AAVN	ASVN	AHO
Characteristic			Standard	Strong (Thick)	Standard	Low resistance	H^+-selective	Low proton leakeage	Monovalent-ion-selective	High temp. & Alkali-proof
Usage			ED	ED	ED	DD	ED	ED	ED	ED
Thickness		μm	100	250	100	95	160	120	120	300
Counterion			Na^+	Na^+	Cl^-	Cl^-	H^+	SO_4^{2-}	Cl^-	Br^-
Burst Strength		kPa	200	1150	250	150	550	550	200	1200
Resistance (77°F)	0.50 mol/L NaCl	Ωcm²	2.0	4.0	2.0	0.8	25		4.0	20
	0.25 mol/L Na_2SO_4		2.0	4.0	3.0	1.2	40		12	45
	0.50 mol/L HCl					0.8	0.6	7.0		15
	0.25 mol/L H_2SO_4					1.2	0.6	25		55
Transport Number	$t\text{-}Na^+$		>0.95	>0.94						
	$t\text{-}Cl^-$				>0.95	>0.95			>0.95	>0.95
Certification			EC_ 1935/2004		EC_ 1935/2004					

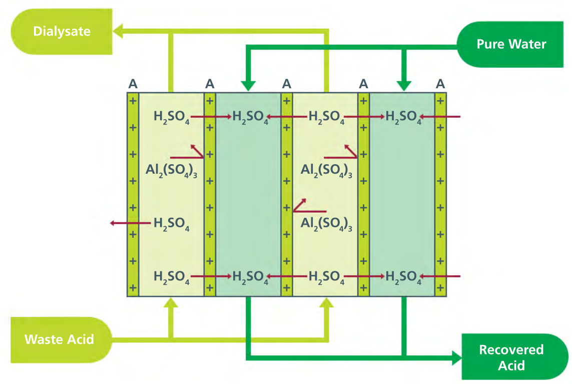
Processes and Applications

Electrodialysis
- Table Salt Production
- Demineralization in the Food Industry
- Industrial Wastewater Reclamation
- Desalination (tap water)
- Acid Recovery
- Substitutional Reactions

Electrolysis
- Reduction/Oxidation Reactions
- Electroorganic Synthesis

Diffusion Dialysis
- Acid Recovery





Electrodialysis

Electrodialysis is a method of desalination and concentration involving the application of a DC current. This is one of the most popular ion-exchange membrane processes and used in various fields such as table salt production, water treatment, and desalination.
An electrodialyzer is composed of anion and cation exchange membranes stacked alternately with thin spacers between them and a pair of electrodes at both ends. This places two types of chambers in between a pair of electrodes. In a typical desalination application, a brine solution is fed into the desalination chambers and transfers ions into the concentration chamber to exit the desalination chamber at a lower salt content. Other arrangements can be used for more complicated chemistries such as substitutional reactions.

Diffusion Dialysis

Diffusion dialysis is an energy efficient ion-exchange membrane process that uses the difference in acid concentration on either side of the membrane to drive separation rather than electricity. Many anion exchange membranes designed for this purpose are alternately stacked with a thin spacer gasket. Waste acid is fed on one side of the membranes and water is supplied on the opposite side in counterflow. Acid in the waste stream is recovered into the water stream through the membrane because of the concentration gradient. Metal ions or other contaminants remain in the waste stream due to their size and positive valence. Thus allowing the efficient recovery of clean acid.

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