

## RALEX® MEMBRANE AM(H)-PES

### DESCRIPTION:

Heterogeneous anion-exchange membrane for electrodialysis, electrodeionization and membrane electrolysis.



Basic material specification			
Ion-exchange group		R - (CH <sub>3</sub> ) <sub>3</sub> N <sup>+</sup>	quaternary ammonium
Ionic form – counter ion		Cl <sup>-</sup>	chloride
Basic binder on base		PE	polyethylene
Fitting fabrics		PES	polyester
Mechanical properties			
Thickness of dry membrane		tl <sub>1</sub> [mm]	< 0.45
Thickness of swelled membrane		tl <sub>2</sub> [mm]	< 0.75
Swelled differences Δ (in demi-water)	thickness	Δ tl [%]	< 60
	length	Δ l [%]	< 3
	width	Δ w [%]	< 4
	weight	Δ m [%]	< 65
Hydrodynamic permeability for water	Δ P = 1 bar	[l/h.m <sup>2</sup> ]	0
Electrochemical properties			
Resistance in 0.5 M NaCl (measured under DC current)	surface	R <sub>A</sub> [Ω.cm <sup>2</sup> ]	< 7.5
	specific	R <sub>S</sub> [Ω.cm]	< 120
Transport number	0.5/0.1M KCl	t <sup>M</sup>	> 0.95
Permselectivity	0.5/0.1M KCl	P <sub>STAT</sub> [%]	> 90
Other properties			
Good thermal resistance: outside membrane stack (regeneration, sanitation) – up to 1 hour 90 °C, more than 1 hour 65 °C, inside membrane stack under DC current 40 °C , for a short time 45 °C.			
Resistance against aggressive chemicals and fouling components.			
Long-term stability at pH 0–10, except strong oxidizing agents.			
Possibility of a use of alkali up to pH 12 for a short time for regeneration.			
High resistance against some industrial membrane poisons.			
Long life cycle.			

### CERTIFICATES:

Membrane production is certified in compliance with **CSN EN ISO 9001:2009** and **CSN EN ISO 14001:2005**.  
**AMH-PES have Sanitary and Epidemiology Certificate for whey and drinking water.**



# TECHNOLOGICAL PROCEDURE FOR THE SWELLING OF RALEX® MEMBRANES



## INTRODUCTION:

The goal of swelling of ion-exchange heterogeneous membranes RALEX® is to bring them to the “working state”. During the process of swelling the physical, mechanical and electrochemical properties of the membrane are changing and the membrane becomes ion-conductive. Besides, there are changes of dimensions and volume of the originally dry membrane format. The end of swelling is marked by reaching a steady state with no further changes of the properties of the membrane.

The membranes RALEX® can routinely function in wide pH range, in temperatures from 10°C to 50°C, in environment without any oxidants and membrane poisons. Suitability of use of the membranes RALEX® must always be consulted with the producer!

## STANDARD SWELLING:

Standard swelling of the membranes RALEX® takes place in demineralized water (or at least in drinking water, after consulting the producer) in temperatures from 25°C to 45°C for no less than 48 hours. The dry membrane is put into water of the prescribed quality or swelling solution and swells for the required period of time. During the process of swelling it is necessary to check if the membrane is completely immersed and to eliminate air bubbles from the surface of the membrane. The membranes must not come to a contact with surface-active substances (detergents), organic substances, oxidants and other so-called membrane poisons that can contaminate the membrane material irreversibly.

## SPECIAL SWELLING WITH CHANGE OF THE ORIGINAL ION-EXCHANGE MEMBRANE:

Special swelling takes place in a proper swelling solution with subsequent conditioning and equilibration of the membranes. Procedures can differ with regards to specific use of the membranes and must be consulted with the producer.

## HANDLING:

Any handling with the membranes RALEX® is recommended in the swelled state in which they are flexible and less prone to deformation. It is also necessary to minimize their removing from the swelling solution so that they do not dry out which causes dimensional changes that can lead to considerable defects in subsequent size adaptation of the membranes. The membranes RALEX® can exceptionally dry out and swell again but this procedure is not recommended by the producer. In the swelled state, the membranes RALEX® are well flexible and shapeable; in the dry state, on the contrary, they are fragile and must not be deformed in any way. It should be pointed out that it is necessary to prevent any damage to the membranes by careless handling (ruptures, breaks, tears etc.).

## SUMMARY:

For use in the electro-membrane processes, the membranes RALEX® must be in the swelled “working state”. Subsequent operations with the membranes, especially their installation to technology, are much impacted by the perfection of swelling. Therefore it is necessary to pay undivided attention to the entire process of swelling.