



## Electrodialyzer

### working principle:

The basic principle of electrodialyzer desalination is to use the selective permeability of ion exchange membrane. The cation exchange membrane only allows cations to pass through and blocks anions to pass through. The anion exchange membrane only allows anionic energy ions to pass through. Under the action of external DC electric field, water ions migrate directionally. Make most ions in one way of water migrate to another way of ion water.



### Application scope:

Electrodialyzer has the main advantages of simple process, high desalination rate, low water production cost, convenient operation and no environmental pollution. It is widely used in water desalination, specifically in the following occasions:

Seawater and brackish water desalination. According to the test data of our company, brackish water with salt content up to 60g / l can be desalinated into drinking water to solve the drinking water source in desert areas.

The resistivity of soft water is 105  $\Omega \cdot \text{cm}$ , which can supply water to low-pressure boiler without salt regeneration and save about 20% coal.

For the pretreatment of deep demineralized water and high-purity water, electro dialysis ion exchange method is adopted to expand the application scope of raw water. It is widely used in electric power, electronics, chemical industry, pharmacy, scientific research and laboratory, reduce the water production cost by more than 50%, save 80% acid and alkali for regeneration by ion exchange method, and prolong the regeneration cycle by more than 5 times. It is used for the purification of beverage and food industry to improve the quality of beer and soda. The increase in quantity has created conditions for creating high-quality famous brand products.

Electrodialyzer can also be used for chemical separation, concentration and industrial wastewater treatment and recovery.

### Construction and assembly method:

a. Structure: electrodialyzer consists of membrane stack, polar region and pressing device.

Membrane stack: it is composed of a considerable number of membrane pairs.

Membrane pair: it is composed of a cation exchange membrane, a diaphragm, a negative membrane and a diaphragm.

Ion exchange membrane: it is the key component of electrodialyzer. The company adopts the heterogeneous mold produced by Shanghai chemical plant.

Diaphragm: it is divided into concentrated water diaphragm and fresh water diaphragm, which are placed alternately between the Yin and Yang membranes to maintain a certain interval between the Yin and Yang membranes. The water flows along the diaphragm plane, the water



flows through the vertical diaphragm plane, and the current flows through the vertical diaphragm plane. The thickness of the diaphragm is 0.9mm, and the polar region includes the electrode, pole frame and water guide plate.

Electrode: it is used for connecting power supply. The electrode of the company adopts titanium pushpin.

Pole frame: placed between the electrode and the film to prevent the film from sticking to the electrode and play a supporting role.

Pressing device: it is used to press the electro dialyzer to make the membrane stack, electrode and other parts form a whole without water leakage.

b. Assembly method: the assembly of electro dialyzer is represented by "stage" and "section". The membrane stack between a pair of electrodes is called "stage". Each membrane in the same direction of water flow is called "section". increasing the number of sections is equal to increasing the desalination process, that is, the assembly mode can be adjusted according to the different requirements of fresh water output and effluent quality. Generally, there are the following forms: one stage and one section; one stage and multiple sections; multiple stages and multiple sections.

#### Outline dimension table of electro dialyzer diaphragm:

Code	Partition plate size (W x L) mm
I	800 x 1600
II	400 x 1600
III	400 x 800
IV	200 x 800
V	200 x 400

#### List of main equipment:

No.	Name	Model	Specifications	remark
1	Electro dialyzer	DSA- II	400x1600	
2	Thyristor rectifier	60A-100A		
3	Vertical precision filter	ç800		
4	Raw water pump	IS65-50-160	Q=25m <sup>3</sup> /h,H=32m	N=5.5KW
5	Pickling pump	40FS-20	Q=6.5m <sup>3</sup> /h,H=20.5m	N=1.5KW
6	Pickling water tank	850x850		

explain:

- The building height shall be  $\leq$  3.0m, the ground slope shall be 5%, and the open ditch slope shall be 1%.
- The floor of the soft water preparation room shall be acid resistant and can be pasted with ceramic tiles.
- There is some room for the plane layout. If other equipment needs to be added, it can be adjusted appropriately.