Electrodialysis Cell Unit

PC*Cell* ED 64 0 02

Technical Data

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1. General

The electrodialysis cell unit PCCell ED 64 is used in laboratory electrodialysis processes to remove ions from one solution (diluate). The ions are collected in another solution (concentrate). The electrodialysis unit PCCell ED 64-2 allows to carry out different types of experiments for a variety of applications, to examine the characteristics of ion exchange membranes in use. It is concepted as an easy-to-manage laboratory cell.

2. Function

The electrodialysis unit *PCCell ED64-2* consists of an anode chamber, a cathode chamber and a membrane stack between them. With this constitution, a variety of experiments, like desalination, can be processed.

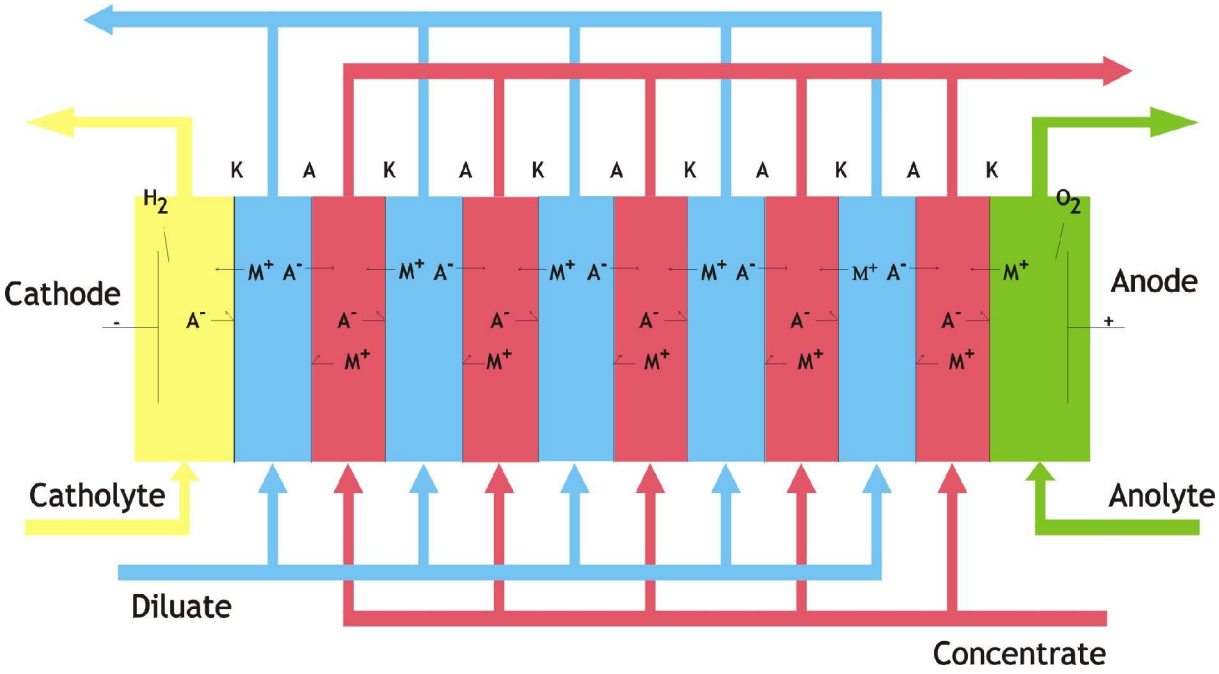

Fig. 1: Functional setup of an ED stack. Salts are removed in cells called "Diluate" and are collected in the Concentrate. Beside this, the electrodes need a solution, the Catholyte and the Anolyte.

To run a standard ED, the membrane stack consists of n (typically 5, 10, 50 or even 100) cell pairs, which are formed by n+1 cation exchange membranes, n anion exchange membranes and 2 n spacers.

At the shown polarity (Fig. 1), one of the cell systems is the diluate and the other one is the concentrate. If the polarity is changed, the function of the cell system changes accordingly.

A complete ED System is set up by this ED Cell in combination with an ED pump unit, e.g. PCCell B-ED 1 and the external solvent tanks build (Fig. 2).

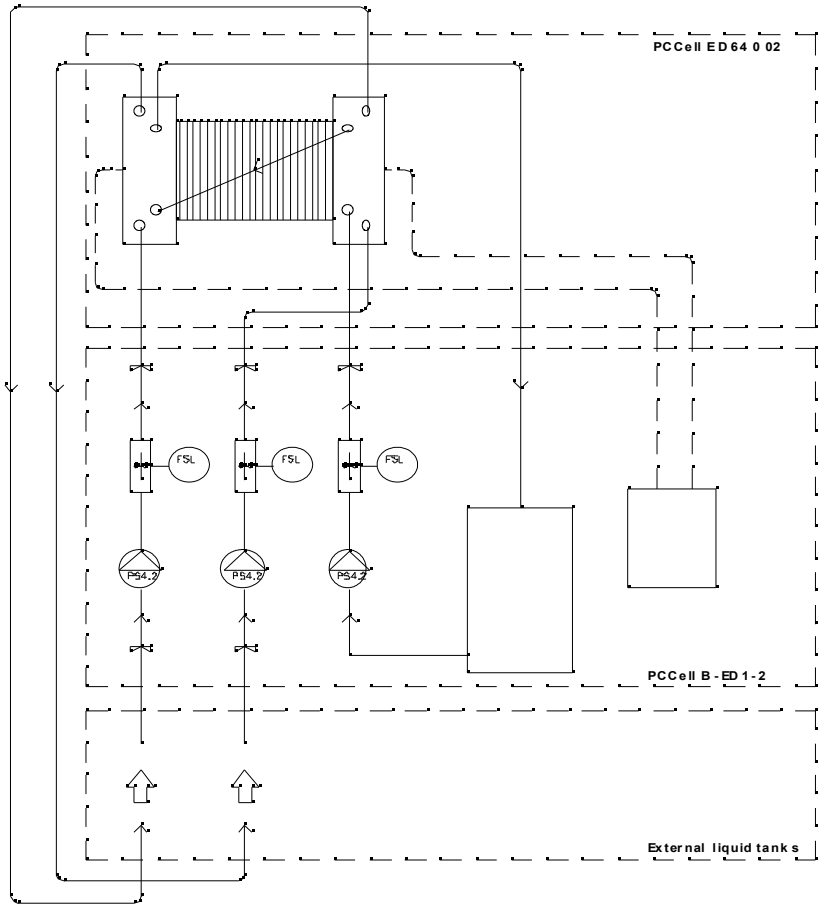

Fig. 2: A complete ED setup: it consists of the stack (upper dotted rectangle),the ED pump unit (middle) and the external electrolyte containers (below).

Please remark in this context, that the ED cell is only one part of the complete system and will work properly only in combination with the other parts.

3. Cell and Parts

The PCCell ED 64 consists of several parts. They are described as follows:

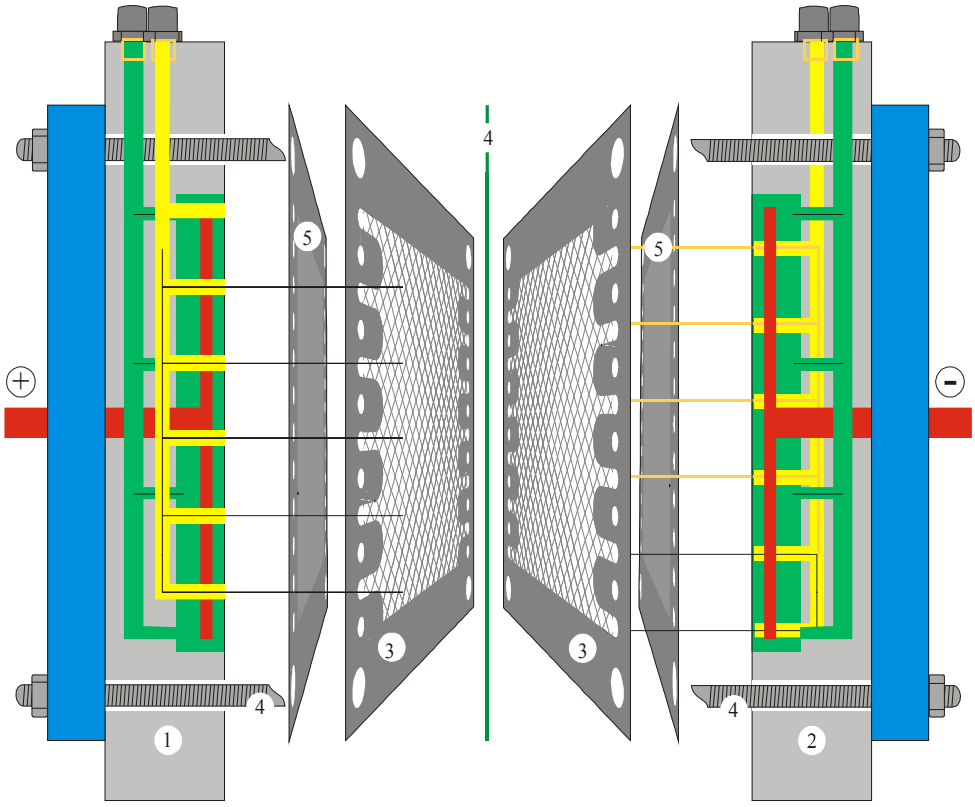

Fig. 3: PCCell ED 64 setup and functional parts

#	Description	Art No.
1,2	Electrode end plates	
3, 4, 5	Membrane stack	
4	Screw set	

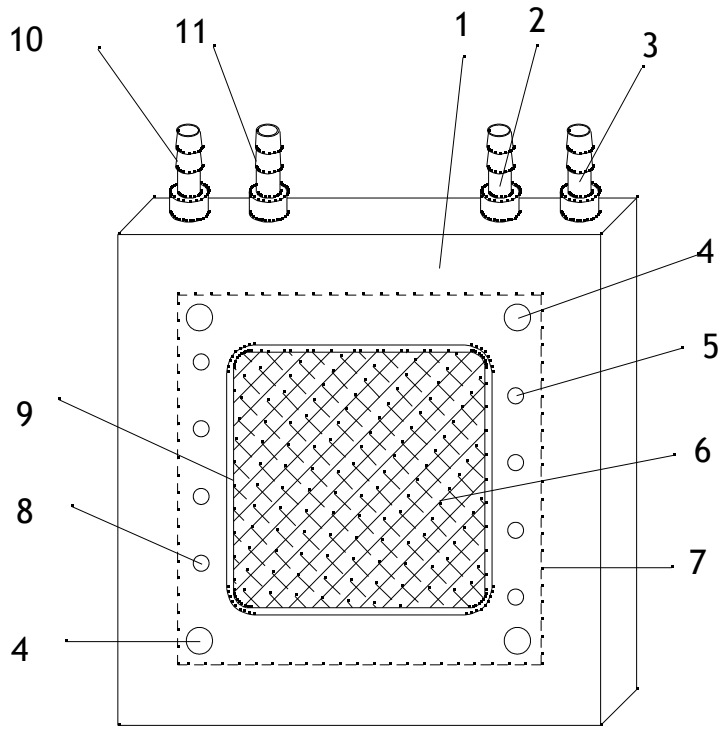

Fig. 4: PCCell ED 64 0 02 Electrode End Plates.

#	Description
1	Electrode Block (PP)
2	Electrolyte liquid inlet
3	Concentrate (Diluate) inlet
4	Clamping Bolt hole
5	Concentrate (Diluate) connector hole to spacer
6	Electrode
7	Membrane and Spacer size and position
8	Diluate (Concentrate) conector hole to outlet
9	Electrode compartment
10	Diluate (Concentrate) outlet
11	Electrolyte liquid outlet

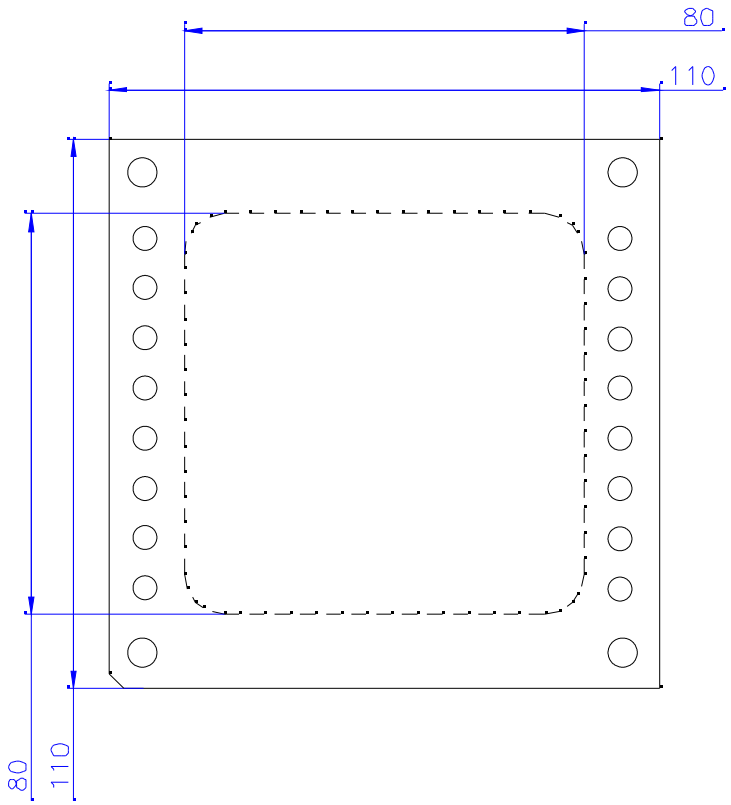

Fig. 5: PCCell ED 64 0 02 Membrane size. Size given is in mm. Dotted square area in the middle of the membrane is the active membrane area of the cell.

4. Technical Data

Stack

Membrane size	110 x 110 mm
Active membrane area	64 cm^2
Membrane spacing	electrode - membrane: ca. 1 mm over cells: 0,5 mm
Number of membranes	Maximum 25 cell pairs
Current Connectors	4 mm banana plugs
Processing length	80 mm

Medium Contacting Materials End plate materials

Cellframe	polypropylene
Tubes	polyethylene
Electrodes	Titane, Pt/Ir coating

Sp acer options

	PVC	Silicone	Viton	EPDM	Food approved silicone / polyetheylene	Silicone / Polyester	Silicone /PVDF	Silicone / Polyetheylene
End spacer	1	1	1	1		1	1	
Spacer ED 64 0 04					1	1	1	1
Spacer ED 64 0 02					1	1	1	1

1 available

Dimensions and Weight (ca)

width	165 mm
depth	150 mm
height	190 mm
weight	2.5 kg

Electrical Connecting data

	ED 64
Type	only connect the cell with a galvanically isolated DC current circuit. DANGER!
Max Amp.	5 (depend on application, temperature etc.)
Max. Voltage	Max. 2 V / cell pair

Hydraulical Connecting data

	ED 64
Type	connectors for 8 mm id tubes
Flow through electrode circuits:	nominal150 l / h
Nominal flow through concentrate and diluat per single cell	4-8 l / h (10 cell pairs result in 40-80 l / h Flux through concentrate or diluate)
Max. pressure	transmembrane pressure has to be kept zero: Never pump only one of the diluate / concentrate circuits alone!
pressure drop over cell	Max. 0,5 bar

5. Application Examples

The PCCell ED 64 is intended to be driven in a batch process. Process length and nominal flowthrough are given above.

Figure 7 shows an example of a batch desalination (conductivity of diluate against time). The effect of a single pass desalination at the start and stop time result in a conductivity jump. It depends on the current, flowing and other factors. The plot shows, that it is - more ore less - proportional to the current.

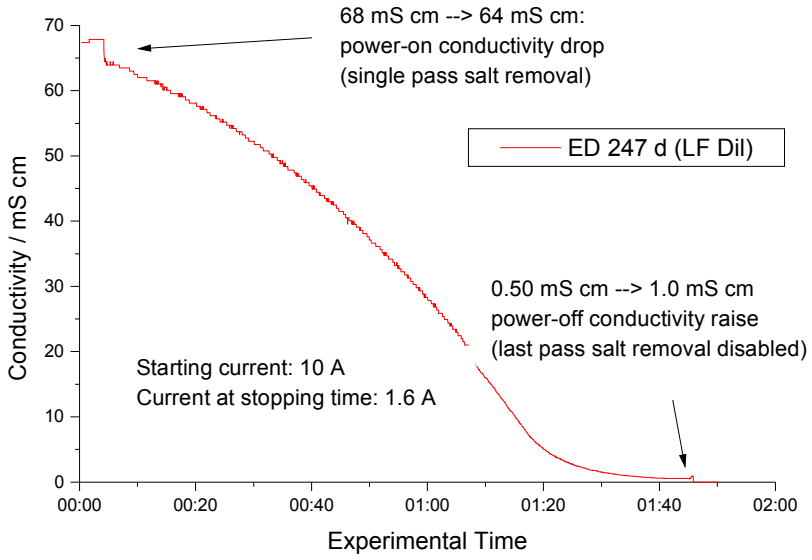

Fig. 6: A batch desalination of aqueous NaCl, about 14 l / m2.

Figure 6 shows the salt (calculated as NaCl) removal in dependence of the current at theoretical current efficiency (ce) and at 85% ce. With the PCCell ED 200 you can expect for sodium chloride ce's in the range between 90 and 95 %. It depends on current denity, concentration and other factors. The amount is given per cell pair. A 25 cell pair- unit will make 25 times of this.

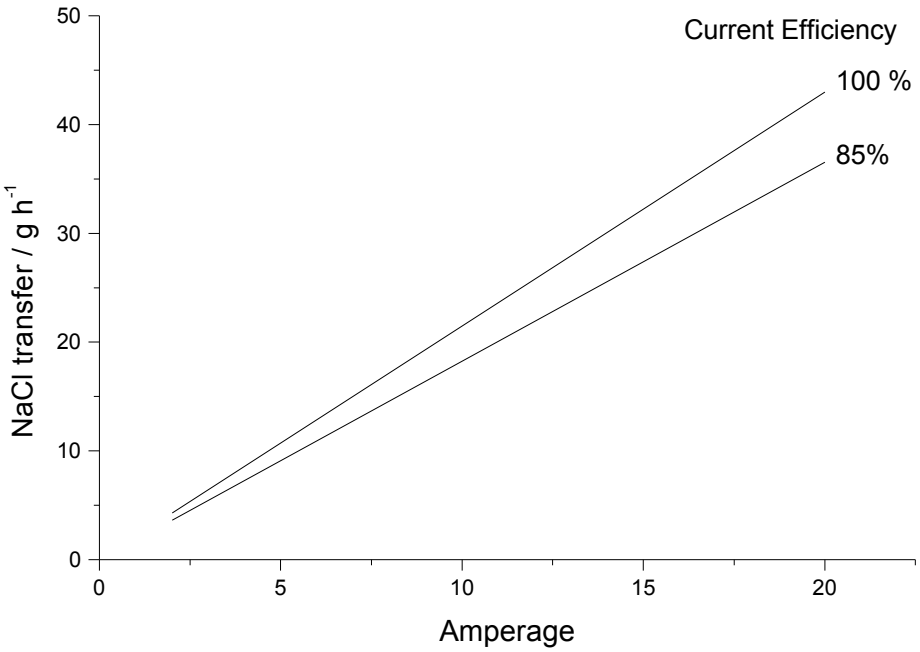

Fig. 7: Transport rate of one ED cell pair in dependence of the Amperage.

6. Application areas

Desalination of salt water

Stabilisation of wine

Whey demineralisation

Pharmaceutical application

Pickling bath recycling

7. General Remarks / Safety

By running an electrodialysis with this cell unit, concentrated acids and bases, which are corrosive, may be produced. Adequate protective measures have to be taken. At the electrodes, explosive gases and aerosol may be produced. Also in this case, appropriate protection has to be ensured. The cell has to be run in a tank large enough to collect any liquids passing out of the system.

8. Further Information / Contact Address

For further information, visit our web site www.electrodialysis.info. In case of any technical questions, please contact

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