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## PROFILED ION-EXCHANGE MEMBRANES PRODUCTION USED IN ELECTRODIALYSIS

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The article is devoted to several methods for producing profiled ion-exchange membranes (known as corrugated and microstructured membranes).

**Key words:** ion-exchange membranes; profiled membranes; electro dialysis; membrane casting; thermal press; 3D-printing.

Wastewater discharges minimization requires an increasing in the water circulation coefficient at the thermal power plants, that is, the low-waste and non-waste water supply schemes creation [1]. The ion-exchange membranes operation helps to realize this task.

There are three main production methods profiled ion-exchange membranes: hot (thermal) pressing, membrane casting and 3D-printing (by the method of photopolymerization)[2].

The thermal method is relatively easy way of creating a membrane. Firstly, a dry flat heterogeneous membrane is placed between the counter mold (press) and the profile mold. Then, in a thermal press, the membrane is heated. While the membrane melts, the molds are pressed between each other, forming the necessary shape and size. Only heterogeneous ion exchange membranes could be profiled by hot pressing since homogeneous ion exchange membranes are often cross-linked, thus cannot be melted.

Membrane casting can also be used for a homogeneous ion-exchange membrane. The initial membrane solution is poured into the mold. The membrane thickness can be adjusted by changing the volume of the membrane-forming substance while the profile size depends on the used mold. The membrane casting method is based on the solvent evaporation and membrane material itself crystallization [3].

The 3D-printing method provides tremendous opportunities for the profiled ion-exchange membranes production of almost any shape. In this case, a photocurable composition and a special 3D-photolithographic printers are