

Recycle

antifreeze and HVAC

fluids using electro dialysis

Efficient solution for recovery of the spent antifreeze liquids

Reusing spent antifreeze and HVAC (Heating, ventilation and air conditioning) liquids has never been simpler before. MemBrain has developed unique technology consisting of effective pre-treatment and highly efficient electro dialysis to gain mixture of water and clean glycol while retaining low energy and chemicals consumption.

It's intended for antifreeze or HVAC producer or distributor, as well as for waste receivers and hazardous waste liquidators.

www.membrain.cz



Choose the MemBrain solution

- 30 years of proven industrial applications
- Economical & efficient process
- Complete technology for full control of the process
- Supported by aftersales services



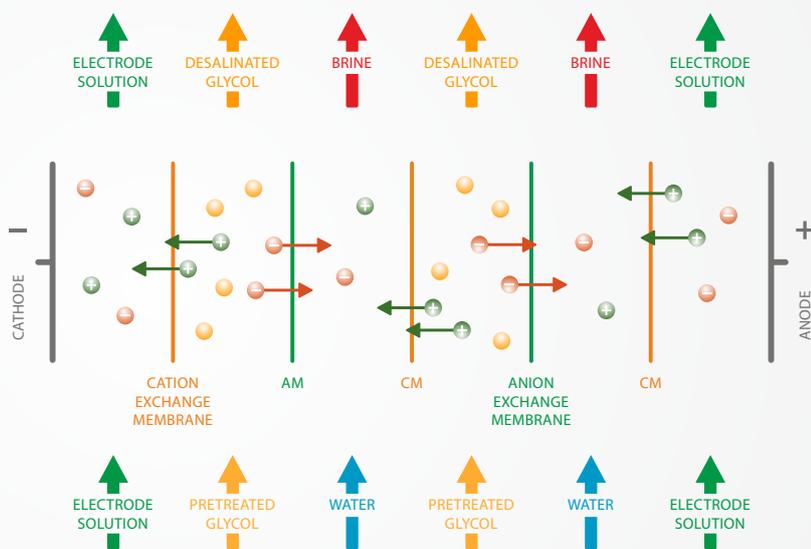
Reused glycol = environmentally friendly product mark. Glycols reuse instead of their discharge have a positive impact both on economy and on ecology of antifreeze

MemBrain solution with Electrodialysis explained

RALEX® ART Antifreeze Reuse Technology is the complex solution integrating pre-treatment with electro dialysis desalination stage. Goal is to treat used glycol solutions and generate mixture of pure glycol and water for further use in antifreeze liquids production. It's intended for regeneration of antifreeze liquids from automotive, heating and air conditioning liquids and used aircraft de-icing effluents.

Electrodialysis is an electrochemical separation process in which ions from the treated liquid are transferred through ion-exchange membranes from one solution to another under the influence of DC voltage; charged components are attracted to the cathode or anode and collected in the concentrate stream.

The custom electro dialysis technology has been fully developed from membranes to units by our parent company MEGA since 1985. We have more than 30 years of experience in industrial and environmental membrane separations applications.



Glycol mixture in different phases of purification

Advantages of RALEX® ART purification technology using ED

Our goal is to supply the customer with tailor made complete solution depending on quality and parameters of processed liquid.

While electro dialysis equipment is the standard industrial unit (ELPU), technology for pre-treatment can vary from simple pre-filtration (as for HVAC or airport de-icing fluids) up to complex chemical and mechanical treatment.

If required, our team of experts in Membrane Innovation Centre at state-of-the-art equipped laboratories will set-up required procedure for your specific product and we supply complete line.

Low energy consumption in ED process are main advantages of our technology.

Save your money today and clean environment for tomorrow

RALEX® ART philosophy is addition to outfeed product from our technology just missing part of fresh glycol and additives

- You save money for buying 100% glycols
- No need of distillation for concentration
- Significant risk reduction on price fluctuation of glycol concentrate
- Income from disposal fee

RALEX® ART technology overview

It is foreseen several combinations of pre-treatment stage, may involve different levels of filtration, sedimentation, coagulation and adsorption.

As the stage for desalination MemBrain offers electro dialysis process operating in batch mode when high desalination degree is required. The product tank is filled with pre-treated feed solution and then processed. Operation stops when proper diluate conductivity is achieved.

The fundamental advantage is in flexibility of the process control allowing to obtain wanted product quality and the accurate balance of the process.



RALEX® ELPU P2 1xEDR-X/100-0.8

Product

Aqueous solution of glycols with a significantly reduced content of impurities (insolubles, heavy metals, oils, etc.) and the original additives (corrosion and buffering agents of organic and inorganic salts) with conductivity up to 0.3 mS/cm.

Concentration of chlorides and sulphates in the product meets the standard ASTM D6471-10 (the only existing standard for recycled products). After subsequent addition of pure glycols, additives, and other substances in the product, the standard ASTM D6471-10 will be fulfilled completely.

Feed product parameters

Raw spent antifreeze liquid for recycling has common composition as follows

70–85 %	water
15–30 %	glycols (ethylene glycol, diethylene glycol, propylene glycol, glycerol)
< 1.5 %	anticorrosion, buffering and other additives
< 0.1 %	decomposition products of glycols
< 1 %	ions imported with dilution water or as additives counter-ions (Na^+ , K^+ , Ca_2^+ , Mg_2^+ , Ba_2^+ , Sr_2^+ , SO_4^{2-} , F^- , HPO_4^{2-})
< 0.2 %	metals released from the engine (Fe, Mn, Pb, Cu, Zn, Cr, Sn, Al)
< 0.2 %	impurities resulting from random collection of targeted liquids (oils, suspended solids)
	Operating Feed Limits for ED
Temperature	20–35 °C
pH	6–11
Chlorides	< 500 mg/l
Absorbance	Three or more peaks corresponding to red, green and blue color are not possible.