JSC “Membraninės Technologijos LT“

A company specializing in the development and manufacture of modern electrodialysis equipment and technologies based on own know-how and the best commercially available membranes and exclusive constructional materials.





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Company introduction

- Founded in 1996
- Shareholders: private capital 100%
- Location: Lithuania, European Union
- High skilled team of 15 employees
- Company mission: We are changing limits of electro-membrane processes and penetrate new applications where previously electrodialysis either couldn't be used at all or hasn’t been used yet due to certain limitations
- Main activities:
    - Development of new technological processes based on the principles of classical (ED/EDR) and bipolar (EDBM) electrodialysis, as well as electromembrane diffusion-dialysis extraction (DDE) and integrated industrial complexes based on them.
    - Design, production and supply of state-of-the-art electromembrane equipment
    - Upgrading of existing ED plants supplied by another vendors.
- We use commercially available high quality ion-exchange membranes which are suitable for desired application, all other ED components like spacers, electrodes are developed and manufactured based on own know-how

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Our technological solutions based on electrodialysis

- Demineralization of solutions with high viscosity, density and temperature
  - All types of whey and other proteins products at high concentration of dry matters
  - Concentrated delactosed whey, WPC
  - Sugar molasses and semi-products of sugar production
  - Chicory solution, inulin; juice and wine stabilization
  - Gelatin, collagen peptides, protein hydrolysates, amino acids, etc
  - Crude bio-glycerin
- Desalination/demineralization and concentration of aqueous salt solutions
  - natural mineralized water
  - industrial technological solutions of various origins, wastewater
- Reagent-free pure alkali recovery from alkali containing effluents for multiple re-use
- Electrochemical synthesis of new pharmaceutical substances
  - effective alkaline hydrolysis
  - continuous reactions of double decomposition of two electrolytes of different salts
  - electro-membrane separation using bipolar electrodialysis EDBM, etc.

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Electro-membrane stacks

- We design, manufacture and deliver electrodialysis modules with unique characteristics, various capacity and for various applications.
- Each type of electromembrane module can be designed with 2-, 3- or 4- independent flow channels depending on application.
- Our stacks are used for process demonstration, research & development of new applications, experimental lab and pilot testing as well as for industrial manufacturing.
- Stacks have EU origin and are delivered along with necessary documentation, certification, warranty and post-warranty service, technical support and spare parts.

Lab modules
LEMA

Pilot-industrial modules
EMA-TMH2

Low-tonnage modules
EMA-L

Industrial heat-resistant
modules EMA-TM / EMAC-T

Electromembrane Diffusion-
Dialysis Extractor DDE

Bipolar module EDBM
EMA-BM-CC2

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Main technological features and advantages

- **OPERATION AT HIGH TEMPERATURE.** Our stacks can process solutions in wide range of temperature from +10°C up to +70°C. Traditional electrodialysis systems operate at temperature in range 15-40°C;
- **PROCESSING OF FEED WITH HIGH DRY MATTER.** Demineralization of viscous solutions with 40-45%TS directly without water dilution. Traditional electrodialysis systems needs in dilution of raw materials up to 18-20% TS;
- **LOW PRESSURE.** Low operating pressures of feed solutions 0,5–1,0 bar in one stage. In most of electrodialysis systems operation pressure can reach to 3,5-4 bar;
- **NO INTERNAL LEAKING.** Due to our unique spacer and stack design we do not have physical internal leakages between product and concentrate chambers. In most of electrodialysis systems the loss of products have substantial amount, and this is the real problem;
- **NO EXTERNAL LEAKING.** No external smudges and "sweating" on the surface of membrane stacks (stacks with "dry surface"). In most of electrodialysis modules external surface of membrane stacks usually wet. As a result, under the modules arises spills of solutions, and in some cases on the surface even mold is formed;
- **DIRECT COUNTER-CURRENT OF FLOWS.** Direct ("true") counter-current flows of the working solutions inside the membrane stack allows higher level efficiency of demineralization and optimal conditions for membranes.
- **UP TO 4 STACKS IN SERIES.** Possibility to install 2, 3 and 4 modules in the technological production line in series, without intermediate tanks and additional pumps to provide one-flow ("single-pass") deep demineralization scheme.

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Electromembrane plants

- Apart from single stacks, we also supply complete electrodialysis plants on the "turn-key" basis.
- Our equipment has been installed at more than 100 enterprises in various industries of the EU, CIS, Middle East and Asia, South America - metallurgical, energy, pharmaceutical, chemical, food, hydrometallurgy, etc.
- Pictures of typical ED units and real industrial projects are shown below.







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Some references

- Special EDAM technology for the efficient process of alkaline hydrolysis in the industrial production of pharmaceutical substances.
  - 1998, 2000, 2002: JSC "Grindex", Latvia
  - 2008, 2009, 2014: JSC Pharmaceutical Company "Salutaris", Ukraine
  - 2005 -2015: commissioning 10 objects in Ukraine and Russia (*customers are confidential*)
- Energy-efficient DDE technology for reagent-free alkali recovery from mixed wastewater after ion-exchange units with subsequent alkali concentration for reuse in water pre-treatment unit. Date of commissioning - 2011, 2016 (modernization). Kazan Power Station-3, Tatarstan, Russia.
- Reagent-free low-waste EDR technology for treatment of cyanide-containing wastewater in metallurgical industry. Date of commissioning - 2014, Kosogorsky metallurgical Plant, Tula, Russia.
- Low-waste reagent-free complex technology for bio-glycerin processing (decolorization and demineralization). Date of commissioning - 2013, 2014, 2017. Latvia, Ukraine, Russia (*clients are confidential*).
- Effective complex EMU technology for additional extraction of sugar from waste sugar production and semi-products. Date of commissioning - 2016-17. JSC Gorodeisky Sugar Plant, Belorussia.
- Bipolar and Classical Electrodialysis in complex Plants for conversion of salts, purification and concentration of produced acids of rare elements. Date of commissioning - 2018, Lithuania; 2022-2023, Kazakhstan (*clients are confidential*)

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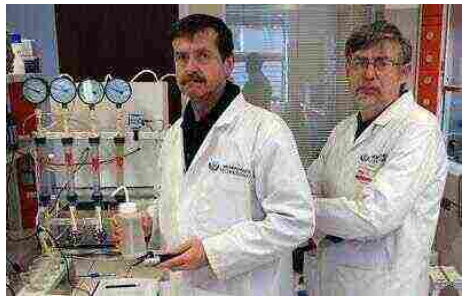
New technologies developed during last 6 years

1. ED-EDBM technology. Reagent-free technology for acid whey processing with additional production commercial bulk lactic acid and fertilizer.
2. ED-C technology for demineralization of concentrated acid and sweet whey (26-28%TS) without dilution in "one-pass" mode with applying the “warm process". *(The technology has been implemented on an industrial scale at 4 European plants. 2019 - 2023)*
3. ED-T technology for demineralization of whey protein concentrates (delactosed whey/mother liquor) without additional dilution, in continuous mode, at higher temperature of solution.
4. ED-T technology for removal inorganic salts from gelatin different origins, collagen peptides and other similar products in a continuous mode, without additional dilution/heating/cooling, with higher temperature and viscosity/density of solutions.
5. ED-T technology for demineralization of chicory extract by reagent- free method in production of inulin.
6. DDE technology. Reagent-free alkali / acids recovery from solutions with high content of alkali /acid and mix of salts. (*The technology has been implemented in 2016-2023.)*



We invite you to jointly implement indicated projects on industrial scale and/or carry out new R&D work for further used of results in your business.

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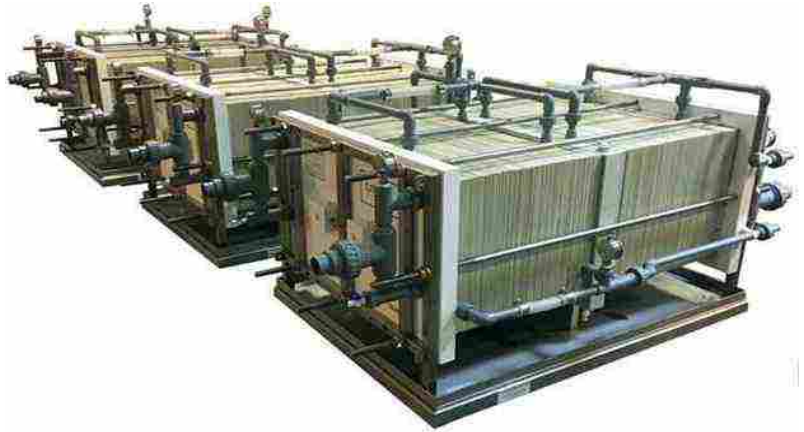
New generation of ED stack - EMA-TMH2

Recently we introduced our innovative electrodialysis stacks EMA-TMH2 types, optimized at the moment not only for dairy and food processing, but for a lot of different applications. Now we can to confirm earlier declared characteristics, which include following features:

- Feed at high total solids, viscosity and temperature up to 65-68°C can be processed in one-pass mode.
- Available configurations with one, two or three hydraulic stages. Number of cell pairs per stage can vary from 100 to 300. Max. 600 cell per stack.
- Manufactured in both version with polarity reversal (EDR) or without (ED).
- Excellent hydraulic design properties (low pressure drop/lost per stack and low inlet pressure)
- Low energy consumption.
- Compact design, easy handling and maintenance.
- All medium contacting materials are food proof.



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Successful applications of new generation ED stacks

ED Plant EMU-3
for demineralization of acid whey, 24-26% TS (product quality D50, D70, D90). Poland, 2020

ED Plant EMU-2
for demineralization of acid whey, 20% TS (product quality D70). Ukraine, 2019-2020

ED Plant EMU-6
for demineralization of acid and sweet whey, 24-26% TS (product quality D70). Russia, 2021-2022

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Successful applications of new generation ED stacks

continuation

ED Plant EMU-2 for demineralization of gelatin, 24-30% TS (product quality D85). Poland, 2022

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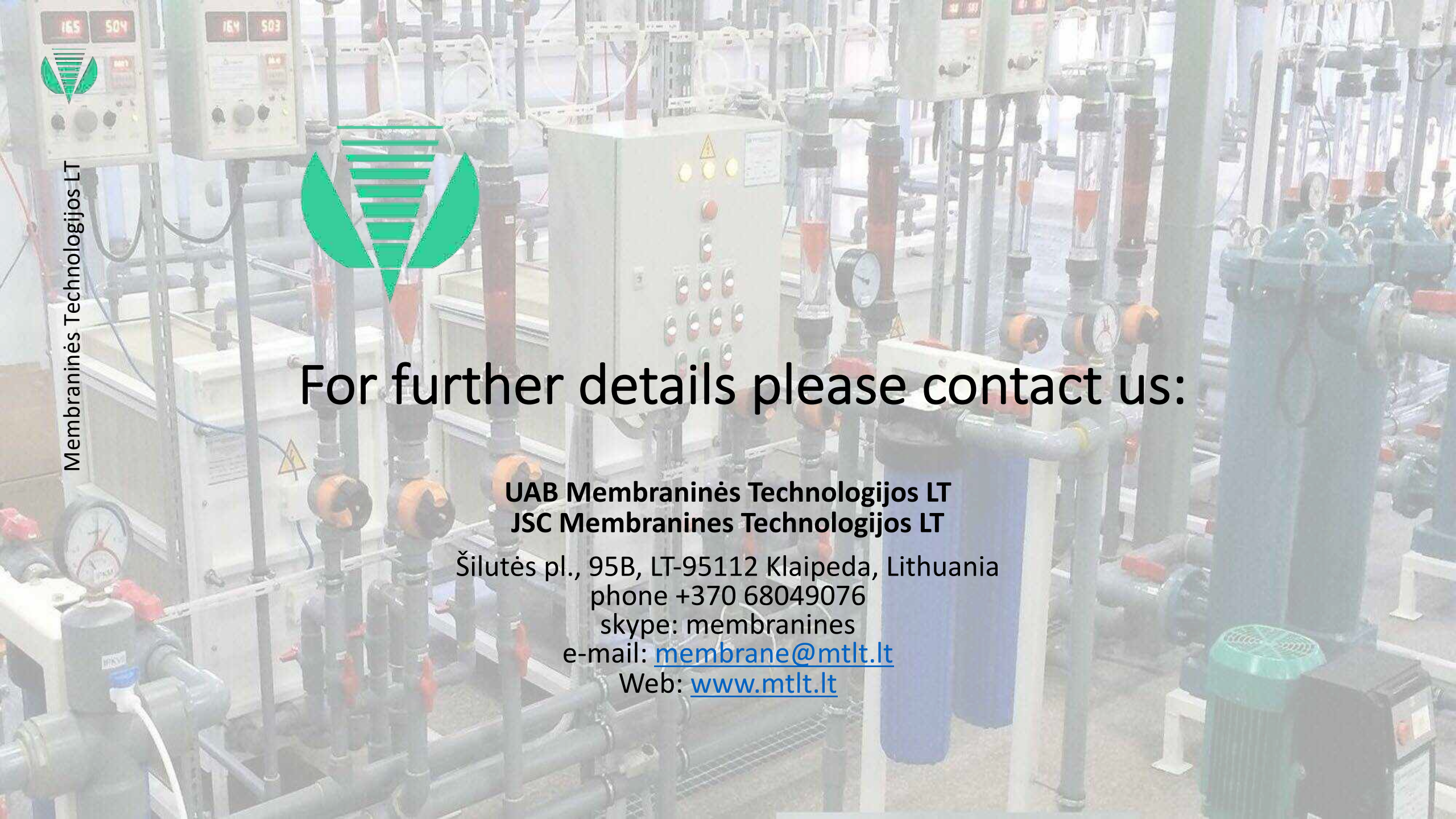
ATTENTION!
We invite you to place an order to conduct pilot/industrial tests directly at your enterprises for successful scaling and further use in your business.
For these purposes, we will provide you with our low-tonnage ED pilot plant EMU-1 (1.0-1.5 m3/h) and ensure the participation of our professional team.
At the same time, we`ll provide initial training at place of your specialists.



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