MemBrain

MEMBRANE INNOVATION CENTRE

AMINE SOLVENT PURIFICATION TECHNOLOGY FROM VARIOUS REFINERY STREAMS

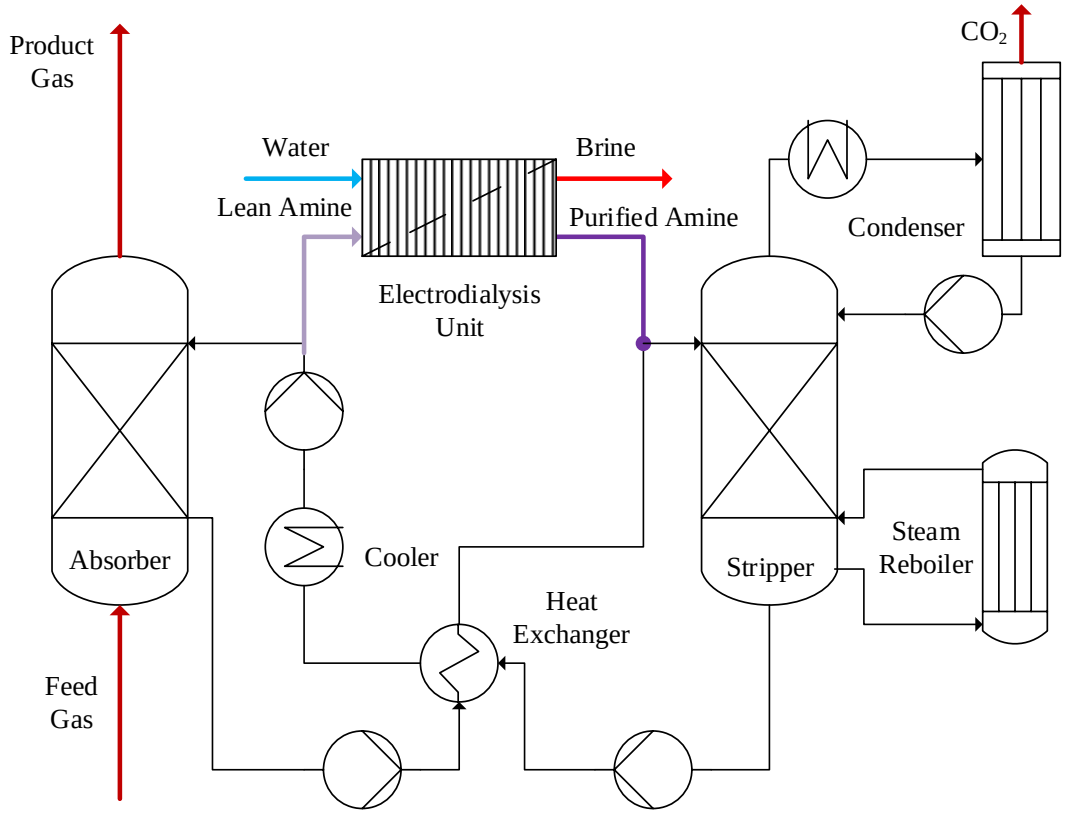
The task is keeping the amine unit at maximum performance during the CO_2 capture process. The technical solution is based on integrated membrane technology.

Separation of unwanted compounds from amine scrubber treating various process streams:

- Partial oxidation of petroleum residues
- Fluidized Catalytic Cracking (FCC) Flue Gas
- Coker Off-gas

Membrane technology using electrodialysis (ED) allows separation of Formates, Acetates, Oxalates and Bicine.

An illustrative example of the electrodialysis unit placement:



Electrodialysis can act as an artificial kidney treating small slipstream of Lean Amine.

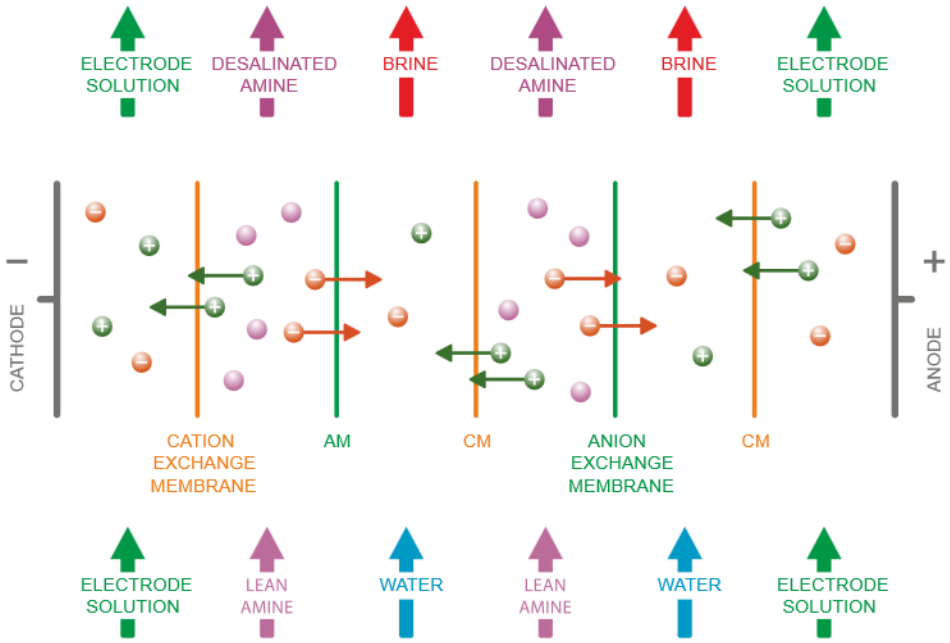
Example capacity of stationary electrodialysis unit

Purifying 700 m^3 TEA solution (30 %) with starting Heat Stable Salts concentration 10 000 ppm to formates and acetates levels below 3000 ppm within five months of stable ED operation.

Advantages of the process based on membrane separation

- Increased Amine Absorption Capacity
  - "Bound" amine is unable to absorb acid gas (CO_2) effectively
- Preventing of Heat Stable Salts Formation and Accumulation
  - Reducing amine solution corrosion potential
  - It is preventing foaming and higher filter changeouts due to FeS precipitates.
- Simple setup and operation
  - Possibility to have a permanent installation
  - No regeneration chemicals are required in compare to ion exchange systems
- Robust and reliable operation with easy to manage the waste stream
  - Organic acids sodium salts are removed into a separate brine stream that can be generally discharged to a conventional WWTP

Electrodialysis principle



MemBrain offers

- Feasibility study with a focus on electrodialysis system setup to sufficient heat stable salts removal
- Evaluation of the membrane performance at lab scale or pilot scale with real amine mixtures (MEA, MDEA, TEA)
- Concept design and basic design of the industrial membrane unit based on field trials
- Technology delivery