

# **SYSTEM AND METHOD FOR SIMULTANEOUS EVAPORATION AND CONDENSATION IN CONNECTED VESSELS**

(PATENT PENDING)

The technology relates to more efficient and more operationally flexible form of distillation. The technology is based on a new concept given by the inventor. As per the concept which relates to simultaneous evaporation and condensation in connected vessels, the molar rate of evaporation in evaporation vessel, molar rate of transfer of vapours from evaporation vessel to condensation vessel through a connected pipe and molar rate of condensation in condensation vessel at a given instance of time will always be same. Any change in temperature or pressure of evaporation or condensation vessel will result in automatic change in the temperature and pressure of the other vessel so as to maintain equal rate of evaporation, transfer and condensation but at a different value from the rate before the change. The concept can be extended to a distillation system wherein molar rate of transfer of vapours from evaporation to condensation vessel is increased by compression or other means.

The technology is similar to but better than both low temperature thermal desalination when operated without a compressor and mechanical vapour compression when operated with a compressor. Low temperature thermal desalination claims to desalinate sea water without crystallizing salt when the difference in temperature of evaporation vessel and condensation vessel is around 8 C whereas the present technology can desalinate sea water till complete salt crystallization when this temperature difference is just around the elevation in boiling point due to salt of around 4 C. Unlike mechanical vapour recompression, the present technology can crystallize salt out of near eutectic brine at any low value of compression ratio by circulating same heat transfer fluid at a suitable high rate successively through evaporation and condensation vessel.

Apart from water desalination, the technology has got application in separation of liquids and solids from water and other liquids.

The technology has been deeply analysed and various embodiments of the technology have been extensively simulated using MS Excel and VBA. A prototype of the technology could be developed for any of the embodiment to demonstrate effective working of the technology before developing the commercial system. The technology can be commercialized within one year of getting the funding and finalization of suitable partner company.