

CLAIMS

What is claimed is:

1. A multi-effect multi-train desalination device, MEMTD, by phase change, characterized in that the desalination device comprises at least two trains of n
5 evaporator-condenser effects, each train of evaporator-condenser effects comprises at least one latent heat exchanger in each of the evaporator-condenser effects, at least one sensible heat exchanger (6) between every two trains of effects in which sensible heat is exchanged between the brine flow (18) at the outlet of the last evaporator-condenser effect of the preceding train of effects and the incoming water flow (20)
10 which is supplied as feed water (21) to the first evaporator-condenser effect of the following train and a final condenser (7) which condenses, at least in part, the vapor evaporated (22) from the last evaporator-condenser effect of the last train of evaporator-condenser effects.
2. Desalination device according to claim 1, wherein the at least one latent heat
15 exchanger in each evaporator-condenser effect is a HTRDHE by having the evaporator side covered, at least in part, of microchannels through which the saline solution to be evaporated flows with the liquid-gas interface curved across the entire width from wall to wall of the microchannel and by having the condensing face covered, at least in part, by microchannels through which the condensed water flows with the liquid-gas
20 interface curved across the entire width from wall to wall of the microchannel.
3. Desalination device according to claim 2, wherein HTRDHE is a HTRDHE characterized in that the transition region (4) of a meniscus or curvature of the liquid-gas interface of the evaporating face is in proximity to the transition region (56) of a meniscus or curvature of the liquid-gas interface of condensed water on the
25 condensing surface or a water-free zone on the condensing surface in which vapor condenses (61) and a rapid latent heat transfer pathway is created in which the flow of energy in the form of latent heat released by the vapor (58) condensed on the condensing transition region (56) of the condensing surface or by the vapor 61 condensed on a water-free zone of the condenser face flows with low thermal
30 resistance, with a low temperature gradient and with a high heat flow through the wall 60 of the condenser evaporator tube or chamber to the evaporator transition region (4) of the evaporator face where the energy flow is transformed, at least in part, into latent heat of evaporation of the evaporated vapor (59).
4. Desalination device according to claim 2 or 3, wherein at least one train of
35 condenser evaporator effects is coupled to at least one absorption heat pump wherein

a portion of the vapor (25) evaporated in the last condenser evaporator effect of at least one train of condenser evaporator effects is supplied (26) to the absorber (27), where water vapor (36) from an external steam source is supplied into at least one condenser tube (38) of the generator (42) of the at least one absorption heat pump and the condensed water is returned to the external steam generating plant, where the generator generates water vapor (39) which is supplied as part of the water vapor supplied to the first effect of at least one train of evaporator-condenser effects. at least one train of evaporator-condenser effects.

5. Desalination device according to claim 2 or 3, wherein at least one train of evaporator-condenser effects is coupled to at least one steam ejector (45), where part of the vapor (25) evaporated in at least one effect is partly supplied as vapor sucked (44) from the at least one ejector (45) which receives motive steam (43) from an external source producing resulting steam (46) which is supplied as input steam to a previous effect.