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- DESALT MVR FC 1500 CRYSTALLIZER

DESALT MVR FC crystallizer is a vacuum evaporation unit by mechanical vapour recompression (MVR) and forced circulation (FC).

This crystallizer uses the **Roots blower** to compress the vapour which is evaporated from the wastewater to rise its temperature and pressure. This vapour is reused as heating source to evaporate the wastewater again.

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Technical data DESALT MVR FC 1500

Parameters	SI units	US units
Distillate production per hour/minute [1]	1500 L/h	6.6 GPM
Electrical consumption [2]	64 kWh/$m^3_{distillate}$	0.242 kWh/$G_{distillate}$
Saturated steam <3 barg In operation/Heating phase	110/180 kg/h	243/397 Lb/h
Evaporation temperature	90 °C	194 °F
Dimensions (L x W x H) [3]	7300 x 2200 x 6200 mm	23.95 x 7.22 x 20.34 ft
Electrical characteristics [4]	400 V III + N + Pe / 50 Hz	400 V III + N + Pe / 50 Hz

Notes:

[1] Data refer to clean water when working continuously in standard conditions (T = 20 °C, P = 1013 mbar).

[2] Electricity consumption expressed in kWh per m^3 of distillate produced.

[3] Dimensions are approximate and should be verified during the detailed engineering phase.

[4] Other voltage on demand.

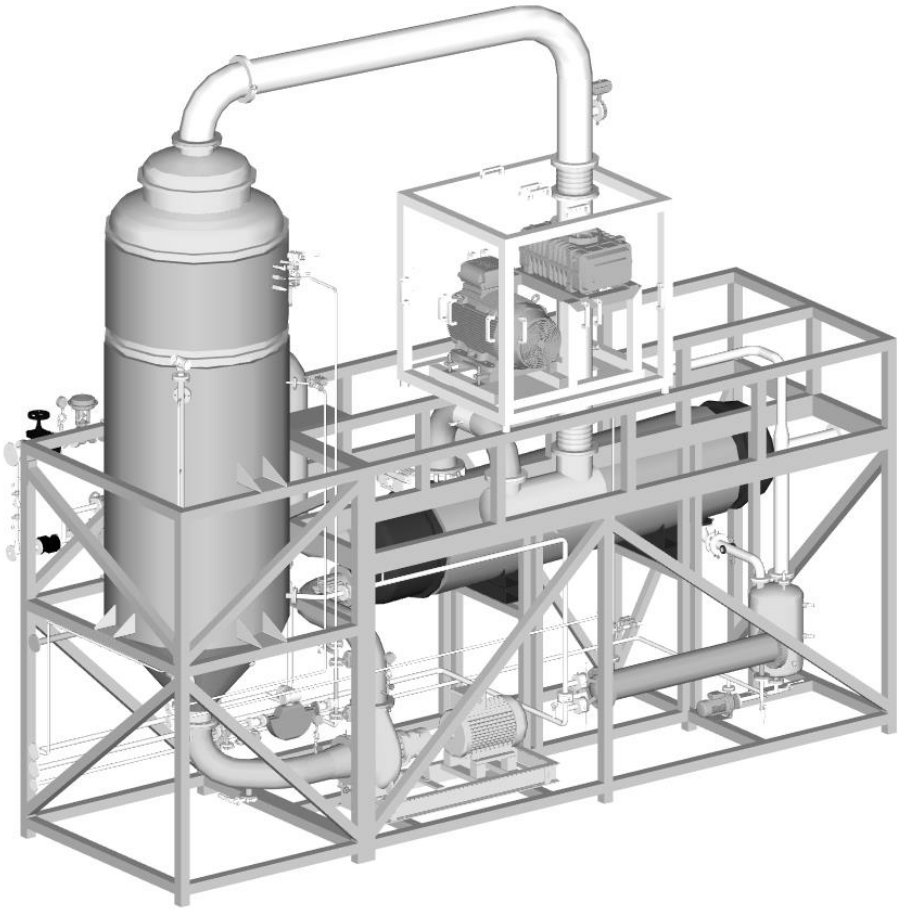
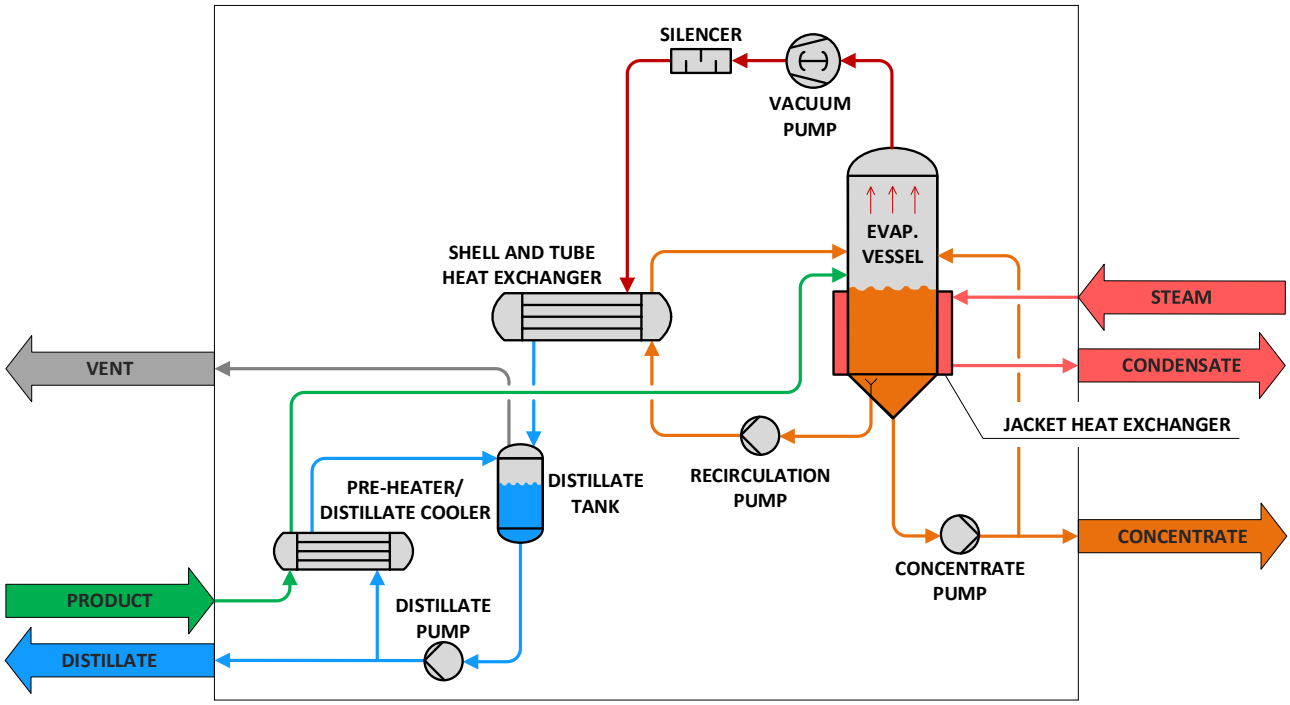


Image for guidance only: 3D view DESALT MVR FC 1500

Functional principle



DESALT MVR FC 1500

Main characteristics

- Fully automatic operation (working cycle 24 hours/day).
- Evaporation occurs thanks to vapour recompression generated by a Roots type vacuum pump.
- The crystallizer uses saturated steam for start-up and during operation.
- Supporting structure made of stainless steel AISI 304.
- Wastewater inlet and condensate outlet automatically operated.
- Digital and analogue control instruments for the automatic monitoring of the system.
- Control by PLC Siemens S7; display of main parameters by LCD Touch Screen.

Evaporation system

- Cylindrical evaporation vessel vertical type with conical bottom to make the separation of solids easier.
- Evaporation vessel incorporates an outer jacket heat exchanger to provide a small amount of steam during the heating phase as well as during operation for temperature maintenance.
- Evaporation vessel fitted with an external shell and tube heat exchanger. The process liquid flows inside the tube bundle at high speed, thanks to the recirculation pump, getting the calories necessary for the crystallization, thus avoiding the stratification on the exchange surface.
- Manual valve for taking product samples during processing.

Vacuum generation system

- The vacuum pump (Roots-type blower) draws off the water vapour from the evaporation vessel, compressed it to atmospheric pressure and pumps the compressed vapour to the condensation area (shell and tube heat exchanger) of the evaporator. The vacuum pump is driven by V-belts from the electric motor located underneath the vacuum pump.

Distillate

- Condensation of the evaporated wastewater takes place in the shell and tube heat exchanger through which the water to be treated passes.
- The condensate is stored in a distillate tank and discharged by means of the distillate pump controlled by level switches.
- The pre-heater transfers the heat of distillate to the in-flowing wastewater.

Concentrate discharge system

- Automatic circuit for concentrate discharge with extraction pump, pneumatic and manual valves.
- The automatic discharge function is programmable by a timer for a complete customization of the process.
- Other control devices for concentrate discharge (conductivity or density meter) on demand.

Cleaning system

- The automatic system is complete with pneumatic valve and rotating nozzle. The circuit allows the dosage of cleaning agents inside the crystallizer. The wash cycle time can be adjusted from the control panel according to the actual needs.

Antifoam dosing control system

- Automatic system with foam formation sensor and variable setting control. The circuit allows the automatic injection of antifoam products inside the crystallizer: the quantity of injected antifoam is adjustable by the control panel according to the actual needs.

Control unit

- Siemens PLC control unit and touch screen control panel.
- Electrical panel, protection IP 54.
- Automatic overload cut-out for all motors.
- 24 volts auxiliary circuit.
- Wiring made in flame proofs cables.
- Level control regulators for tanks and outside reservoirs level.

Material

Description	SAF 2507	AISI 904L
Supporting structure	AISI 304	AISI 304
Vertical evaporation vessel	Upper side AISI 316 Lower side SAF 2507	Upper side AISI 316 Lower side AISI 904L
Shell and tube heat exchanger	Tube side SAF 2507 Shell side AISI 316	Tube side AISI 904L Shell side AISI 316
Vacuum pump (Roots blower)	Rotors: cast iron Casing: cast iron	Rotors: cast iron Casing: cast iron
Valves, pipes and components in contact with concentrate	SAF 2507/GRP	AISI 904L
Valves, pipes and components in contact with distillate	AISI 316	AISI 316
Other valves, pipes and components (antifoam, cleaning)	AISI 316	AISI 316