Tetra Pak® Evaporator Falling Film MVR

Continuous evaporation system.

Application
Tetra Pak® Evaporator Falling Film MVR provides a fully automatic and continuous evaporation system. Tetra Pak Evaporator Falling Film MVR is suitable for the production of the complete range of dairy products. The system is customer specific designed, and therefore available for a wide range of product compositions and capacities.

Highlights
- Long production runs due to high hygienic standards
- Proven technology
- Fully cleanable (Cleaning in Place)

Working principle
Tetra Pak Evaporator Falling Film MVR is fed from the wet process area. From the balance tank product is heated to at least boiling temperature of the first calandria, depending on the final product demands. This can be done by plate heat exchangers, tubular heat exchanger and/or direct heaters by use of condensate, excess vapours, steam and/or hot water. After the heating process the product is fed to the first calandria where the product starts to evaporate.

The evaporator works according the falling film principle, which means that product and vapour are flowing downwards through the tubes. At the bottom, concentrate falls down and vapour is sucked into the separator, whereby the smaller concentrate droplets are separated from the vapour. Concentrated product is pumped to the next pass, whereby the product is further concetrated.

When steam costs are high and/or the amount of water evaporation is high, preferably mechanical vapour recompression (MVR) is used. Major parameters to check is are: availability, reliability and cost of electricity. A density controller in the concentrate flow is used to set the speed of the MVR fan.

After the final pass product is pumped, depending on the product and required concetrate properties, to the next calandria, concentrate tanks of the dryer or via a flash cooler to crystallisation tanks. In case of a next calandria, this could be a steam driven calandria or a MVR driven calandria.

Capacity
Capacity of the evaporator system depends on product composition and intake. For example if skim milk is concentrated from 9 to 50% total solids for a 48,000 kg/hr feed a typical system would be as follows:

SCOPE OF SUPPLY

- Balance tank
- Feed pump
- Pre-heaters
- Calandrias
- Vapour separators
- Condensor
- Ducting
- Instrumentation
- Documentation and engineering

Options

- Low thermophile
- High heat system
- MVR fan on the ground floor or higher up in the building
- Cleaning vapour side calandria, heaters and condenser
- 24 hours/day operation
- Low thermophile
- Sanitation in place (SIP) of the evaporator system
- Steamless evaporator system with hot water replacing steam (also pre-heating)

Consumption
Based on a capacity of 48,000 kg/hr skim milk from 9% to 50% and during normal production:

MVR / TVR SYSTEM

Steam (incl. DSI)	1,625 kg/hr (medium heat)
Electricity	550 kW (absorbed kW for MVR and pumps)
Cooling water	40 m^3/hr with 30°C in and 45°C out
Ring water	1.0 m^3/hr with 20-25°C
Sealing water	1.5 m^3/hr with 20-25°C

MVR / MVR SYSTEM

Steam (incl. DSI)	1,200 kg/hr (medium heat)
Electricity	575 kW (absorbed kW for MVR and pumps)
Cooling water	12.5 m^3/hr with 30°C in and 45°C out
Ring water	1.0 m^3/hr with 20-25°C
Sealing water	1.5 m^3/hr with 20-25°C

100% ELECTRICAL SYSTEM

Steam	0 kg/hr (medium heat)
Electricity	655 kW (absorbed kW for MVR and pumps)
Cooling water	12.5 m^3/hr with 30°C in and 45°C out
Ring water	1.0 m^3/hr with 20-25°C
Sealing water	1.5 m^3/hr with 20-25°C

Dimensions

Required footprint	15 x 7 m
Required building height	18 m