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[About](#) | [News / Events](#) | [Library](#) | [Links](#) | [Services](#) | [Products](#) | [Technologies](#)

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Home > [Evaporation & Crystallization](#) > [Crystallization Systems & Crystallizers](#)

Forced Circulation Crystallizer

Evaporation / Crystallization

Evaporation Technology

Evaporation Systems

Evaporation Applications

Crystallization

Forced Circulation Crystallizer

Oslo Type Crystallizer

DTB crystallizer

Induced Circulation Crystallizer

Crystallizer Applications

Distillation Applications

Energy Management / Energy Optimization

Zero Liquid Discharge (ZLD)

Services

Literature

Contact

Spare parts

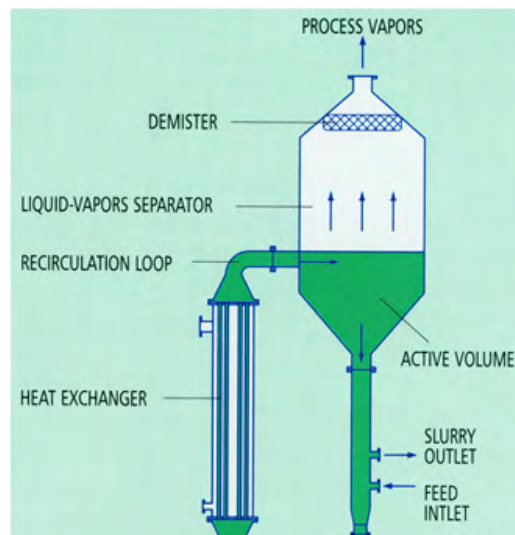
Figure 1 shows a continuous forced circulation crystallizer. It is much like a simple forced circulation evaporator, but it includes specific features to allow correct crystallization, namely:

an "active volume", designed case by case, to get both required residence time for crystal growth and mother liquor desupersaturation a given agitation (recirculation rate) rated to control the extent of supersaturation arising from the evaporation, and to keep the temperature difference in the heat exchanger within reasonable limits
a special design of the liquid-vapor separation area to minimize the carry over losses and avoid the formation of an excessive amount of fines, which is highly detrimental to crystal growth.

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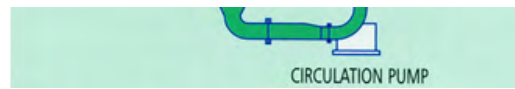


Figure 1 Continuous Forced Circulation Crystallizer

Depending upon specific process requirements, additional devices can be provided. They are:

- internal baffles, used mainly for excess mother liquor overflow and /or withdrawal of fines when crystal growth is slow or disturbed by impurities build-up (see Figure 2)
- elutriation leg, to improve product purity and to deliver a narrow crystal size distribution
- an internal scrubbing section to reduce to very low value the carry over losses, or even to provide stripping or absorption devices when a volatile compound must be recovered

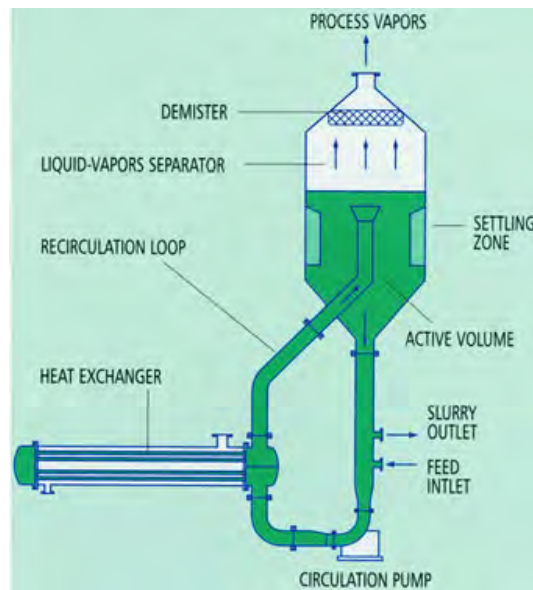


Figure 2 Continuous Forced Circulation Crystallizer

Forced circulation crystallizers are of the (Mixed Suspension Mixed Product Removal) MSMPR type and operate either on controlled or "natural" slurry density depending upon process requirements and/or unit material balance.

These systems can be either single or multiple effects and the vapor recompression concept (either thermal or mechanical) is often applied. Usually, they operate from low vacuum to atmosphere pressure.

As a rule, these units are used for high evaporation rates and when crystal size is not of the utmost importance or if crystal grows at a fair rate.

Almost any material of construction can be considered for the fabrication of these crystallizers.

It is worth bearing in mind that the heating element is omitted for vacuum cooling crystallizers.


Typical products are:

- NaCl (food or technical grade)
- KNO₃

Na₂ SO₄, K₂ SO₄
NH₄Cl
Na₂CO₃H₂O
Citric acid

For more products see in section [Product Experience](#).

When the problem of scaling impedes the process of concentration, a design similar to the one described above is proposed. This applies for CaSO₄ saturated solutions, like fertilizer grade phosphoric acid, demineralization effluents, vinasses,.

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