



Removing moisture from viscous products

Convap® scraped-surface evaporator

Application

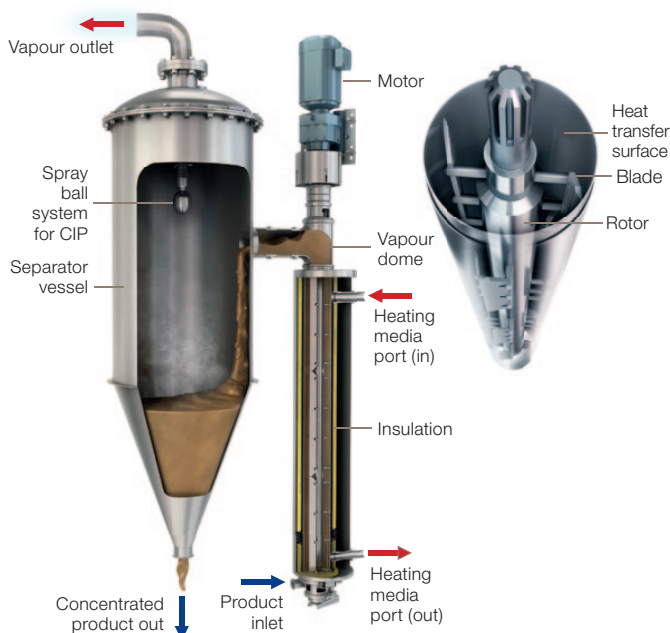
Convap® is a specially modified Contherm® unit designed as a continuous scraped-surface evaporator. This makes it particularly suited for concentrating viscous, sticky and/or heat sensitive products that tend to cause fouling in static types of heat exchanger.

Convap can effectively concentrate products to extremely high solids levels, in some cases up to 99%. And it is often used to process products that rapidly become viscous as they undergo concentration. Convap can function as a pre-evaporator to any dryer type, as it makes the overall process from concentration to drying of a product more efficient.

Typical Convap applications include the production of purées, mashes, pulps, concentrate and pastes from fruits and vegetables. Convap units are also suitable for processing a wide selection of confectionery, protein solutions such as whey protein, lecithin, sugar solutions, chemical and pharmaceutical solutions, and for concentrating plant waste materials into heavy slurry for easy disposal. Convap units can also be used for concentrating coffee and other extracts.



Quadruple Contherm/Convap installation with plate heat exchanger as condenser.



Design

The standard Convap scraped-surface evaporator is based on a modular design and is normally mounted vertically on a wall or column. The modular design permits the deployment of one to four Convap units configured in parallel or up to two units in series to meet specific capacity requirements. Convap heat exchanger cylinders can also be configured so that several units use a shared separator vessel and condenser. Each Convap is assembled from standard, pre-fabricated components.

The major components of a standard Convap unit are:

- Scraped-surface heat exchange cylinder
- Vapour dome
- Separator vessel
- A 4-bladed rotor configuration to prevent product burn-on.

How it works

Just as in Contherm units, the product is pumped (B) into the lower end of the Convap heat exchanger cylinder (A). The heating medium flows in the annular space between the heat transfer wall and the insulated jacket. Mechanical agitation, provided by the revolving blades, creates the convection conditions essential for efficient heat transfer. The scraping blades continuously remove the product film from the precision-/finished cylinder wall.

The Convap rotor, driven by a motor on the upper end of the unit, spins the heavier liquid droplets towards the cylinder wall. This action ensures a continuous re-wetting of the heat transfer surface and the removal of vapour, as well as preventing product burn-on.

The Convap is normally operated under vacuum. Vaporization occurs in the Convap scraped-surface heat exchanger cylinder (A). The separator (D), connected to the Convap by a custom-designed vapour dome (C), allows the separation of the concentrate from the vapour phase. In the separation vessel, the vapour exits the top to a condenser (E) driven by a vacuum pump (G), while the concentrated product exits at the bottom, forced by a concentrate removal pump (J).

As an option, separator vessel can be fitted with a spray ball head for effective CIP cleaning in between batches. A pressure sensor (L) can be fitted on the top of the separator vessel and a level transmitter can be fitted on the concentrated product out piping. A loop for a CIP bypass pump (K) can also be implemented.

Specifications

Working temperature

Product side: -35°C to +170°C (-30°F to +338°F)

Media side: -35°C to +170°C (-30°F to +338°F)

Maximum working pressure

Product side: 20 bar (300 psig) and full vacuum

Media side: 17 bar (250 psig)

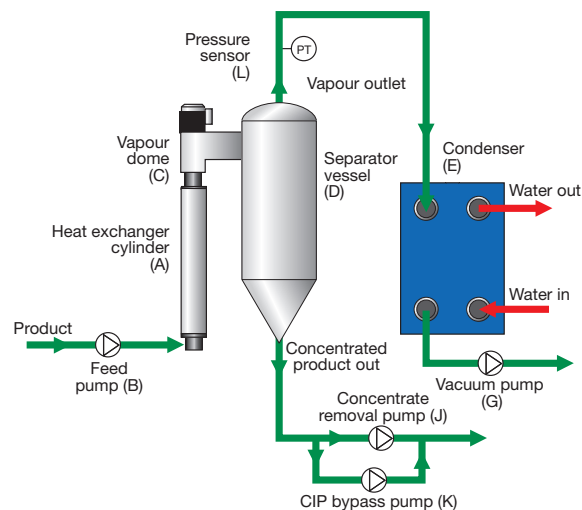
Connections

Product side: 51 mm / 2 inch DIN, Tri-clamp, SMS, other

76 mm / 3 inch DIN, Tri-clamp, SMS, other

Media side: 51 mm / 2 inch Upper - NPT or flange

37 mm / 1 1/2 inch Upper - NPT or flange



Materials

The cylinder heating surface can be made of 316 L stainless steel, 316 L HIPEX stainless steel, corrosion-resistant alloy or nickel, with unique coatings such as chrome, triple-chrome and Alfaloy.

The scraping blades are available in configurations that include Alfalon® III, Alfalon® III-S (metal detectable), PEEK, stainless steel and corrosion-resistant alloy. All blades can be fitted as slotted or spring loaded.

The seals are available in configurations that include single carbon mechanical, carbon flushed / aseptic, hard face and hard face flushed / aseptic, Huhnseal, and high torque / flushed, depending on application.

Optional features

The following optional design features are available for Convap units:

- Control panel with automatic maintenance status features for expansion refrigerant applications
- Rotors in different sizes: 76 mm / 3 inch diameter, 102 mm / 4 inch diameter, 114 mm / 4.5 inch diameter and available in unique designs such as high-torque spline and heavy-duty blade pins
- Motors in a range of different power configurations and in explosion-proof design
- Condenser
- Spray ball mounted in separator vessel, CIP pump and pressure sensor for concentrate flow.

Convap Model	heating surface m ² /ft ²
6x3	0.28/3.0
6x6	0.56/6.0
6x9	0.84/9.0

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Alfa Laval reserves the right to change specifications without prior notification.

How to contact Alfa Laval

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