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SPRAY ENGINEERING DEVICES LTD.

...Energy Efficient Engineering

FALLING FILM TUBULAR EVAPORATOR

Highly Efficient Entrainment Separator & Distribution System

Thin films formed in the tubular falling film Evaporator reduces the pressure losses to reduce operating ΔT.

DEDICATED FOR SUSTAINABLE ENVIRONMENT DEVELOPMENT

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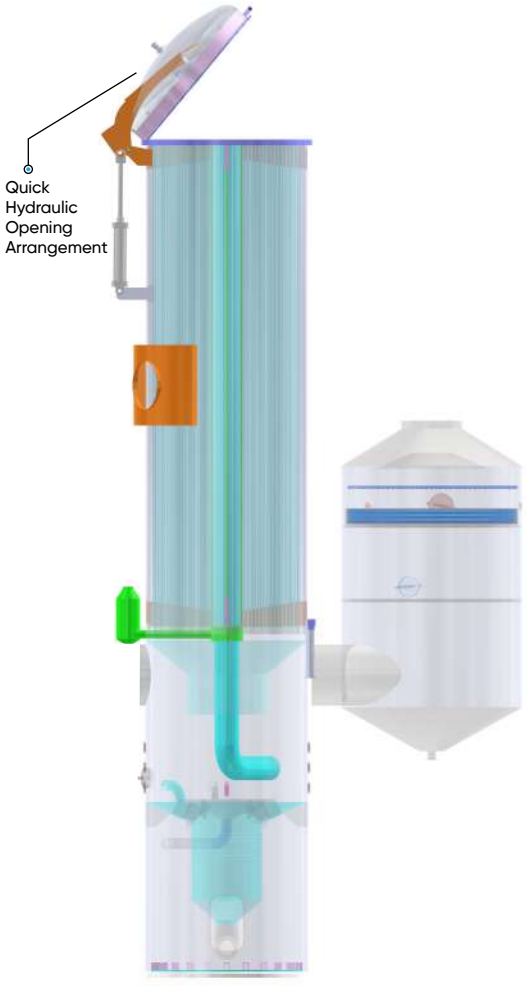
Introduction

A Falling Film Tubular Evaporator is a versatile and highly efficient technology for concentrating liquids, especially for heat sensitive materials due to its excellent heat transfer characteristics and short retention time. It operates on the principle of creating a thin film of liquid continuously flowing down inside the walls of vertical tubes, which are externally heated with steam. Low pressure and temperature steam can easily be used for evaporation which prevents thermal degradation or alteration of sensitive compounds, making them ideal for products like fruit juices, milk, pharmaceuticals, and chemicals. It is especially suitable for the above-mentioned industries because of their energy efficiency, high evaporation rates, and ability to handle viscous or easily fouling fluids.

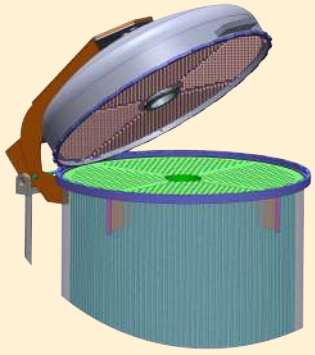
Salient Features

- Low ΔT (3˚-5˚C) operation, Operating range 80˚–125˚C.
- Optimized design for high-heat transfer rate (upto 3500 W/m²k).
- Minimum Residence time.
- Uniform Liquid distribution, thereby ensuring less wetting rate to maintain heat transfer efficiency without dry patch.
- Patented & improved distribution system.
- Central Juice flow for better distribution.
- Efficient entrainment separator (more than 90% removal of upto 5µm size particles).
- Top cover with hinge assembly for easy maintenance and distributor alignment.
- Easy to clean & maintain.
- Intelligent process control with fully automated system.
- Self supporting structure with less foot print area.
- Ability of single unit with heating surface area upto 8000m².
- Quick dishend opening arrangement with distributor.
- Better vapour distribution through the central vapour entry and radial flow of vapour from outer to inner NCG pipe.
- Efficient designed for CIP, having all wetted parts including tube sheets in SS.



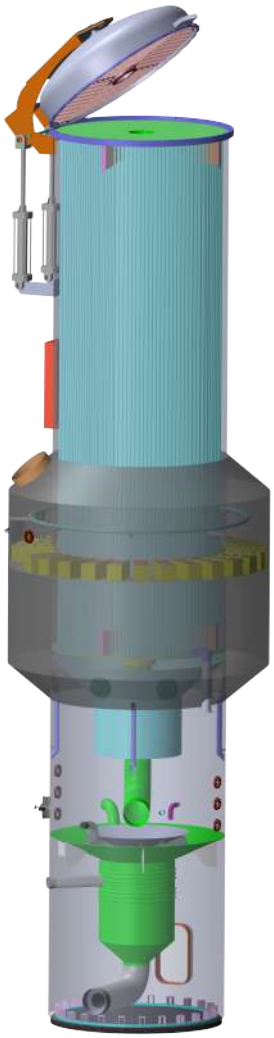
FFE with External Catcher

Dishend with Distributor Arrangement



Performance Parameters

Particulars	Values
Design Pressure (Internal)	300 kPa (g)
Design Pressure (External)	Full Vacuum
ΔT	3 - 5 °C
Design Temperature	150°C
Heat Transfer Coefficient (HTC)	1500 - 3500 W/m²K
Wetting Rate	16 - 16.5 l/hr/cm
Mounting	Skirt
Manufacturing Range	500 - 8000 m²
Tube Length	5 m - 12 m



FFE with in-built Catcher

On site Installation

OPERATING PRINCIPLE

HEAT TRANSFER

The evaporator operates on the principle of transferring heat to the liquid to facilitate evaporation.

DISTRIBUTION OF JUICE

Liquid is fed at the top of a vertical tube, forming a thin film that is heated through tube's surface, facilitating rapid evaporation.

EVAPORATION PROCESS

External heat is used at the outer surface of tubes which allows the evaporation of juice by heat transfer through the tube's surface, facilitating rapid evaporation.

ENTRAINMENT SEPARATION

The process involves separating the vapour from the liquid, utilizing mechanical means to achieve efficient separation.

INDUSTRIAL APPLICATIONS

Although our FFE has multiple applications in various Industries but our main industrial applications are in:

Sugar & Allied Industry

Tubular falling film evaporators (TFFE) play a key role in the sugar industry by efficiently concentrating cane juice thin liquor.

Chemical Industry

TFFE are pivotal in the chemical industry, concentrating solutions, separating salts, and recovering solvents efficiently.

Food & Beverage Industry

In the beverage industry, TFFE are instrumental for concentrating and processing fruit juices, enhancing flavours, extending shelf life, and optimizing production efficiency in the production of concentrated beverage ingredients.

Dairy Industry

Tubular Falling Film Evaporators play a vital role in the milk industry by providing an energy-efficient and customizable solution for the concentration of milk and the production of various dairy products while preserving their quality and extending shelf life.

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INNOVATIVE TECHNOLOGIES FOCUSED ON SUSTAINABILITY

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