

Thin Film & Short Path Technology

Agitated Thin Film Evaporator (ATFE)

Short Path Distillation Unit (SPDU)

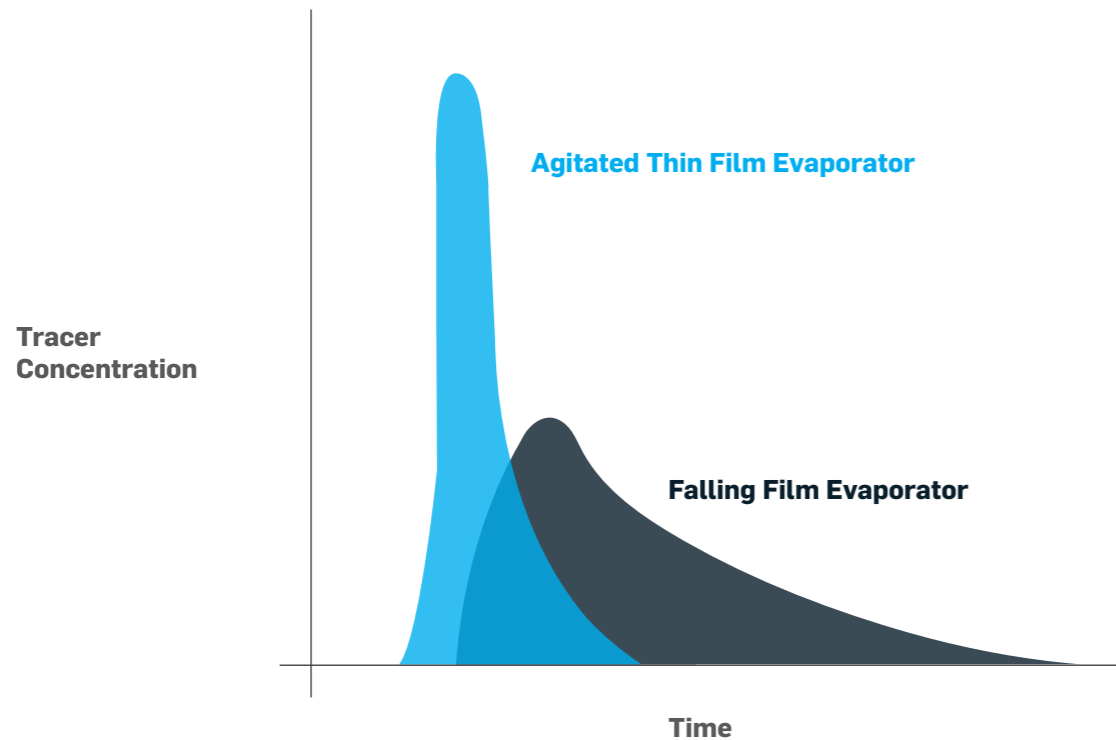
Agitated Thin Film Dryer (ATFD)



Agitated thin film on a heated wall provides many unique features

- The small holdup in the film reduces residence time to a few seconds. The turbulent flow narrows the spread in residence time distribution. Required evaporation is achieved in a single pass, avoiding recirculation and repeated exposure of the product to the heated surface. These features provide big benefits while processing heat sensitive products.
- Absence of hydrostatic head and possibility of shortening of vapour path makes it possible to operate Thin Film units down to 0.001 mbar.
- Separation of volatiles from the non-volatile fraction is near complete. This helps improving the purity and recovery.
- The compact construction reduces the cost of vacuum generation and solvent losses by 60 to 70% as compared to conventional methods.
- It has an excellent turndown ratio.
- Several rotor options means the bottom stream can be liquid, viscous melt, semisolid or powder.

Residence Time Distribution



Rotor Options

No single rotor design is capable of meeting all the divergent process needs. Therefore Technoforce has developed several rotor options to choose from.

As distillation equipment, the feed in the form of liquid or molten mass is evaporated often at deep vacuum, resulting into flowable or viscous bottom stream of product or residue.



Fixed Clearance
Rigid Blades



Zero Clearance
Rollers



Zero Clearance, Blades
with Polymer Tips

As drying equipment, the feed in the form of solution, slurry or filter cake is converted into semisolid mass or fine, free flowing powder.



Fixed Clearance
Swinging Blades



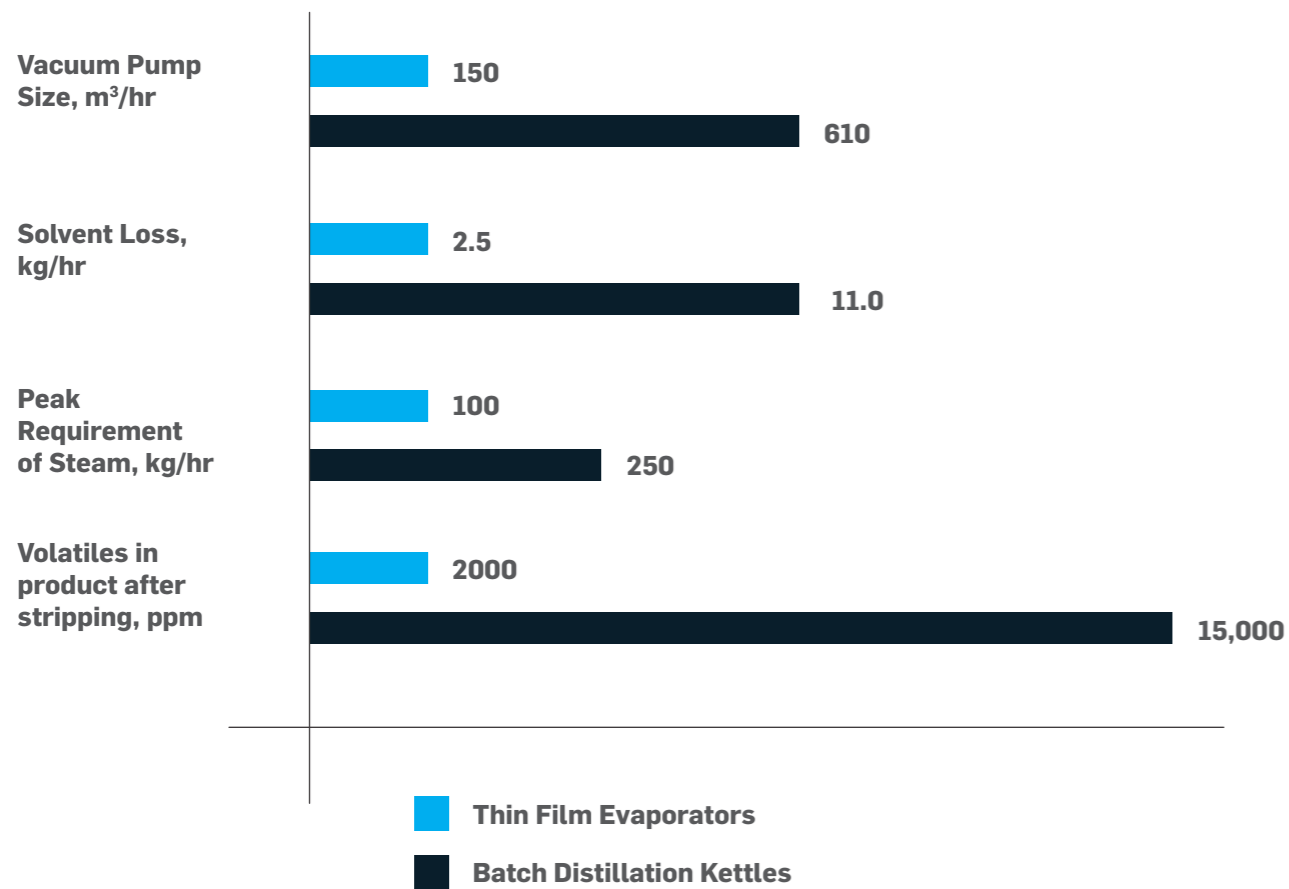
Zero Clearance
Metal Blades



Fixed Clearance
Rigid Blades

Comparison

The advantages of agitated thin film concept are best understood with a real case. The following comparisons represent an average distillation rate of 400 kg/hr of solvent from a product at 10 mbar in a continuous thin film evaporator or a batch distillation kettle.



Agitated Thin Film Evaporator (ATFE)

ATFE rotor has rigid bearing supports at both the ends. This enhances its capability to handle applications having viscous or semisolid bottom streams.

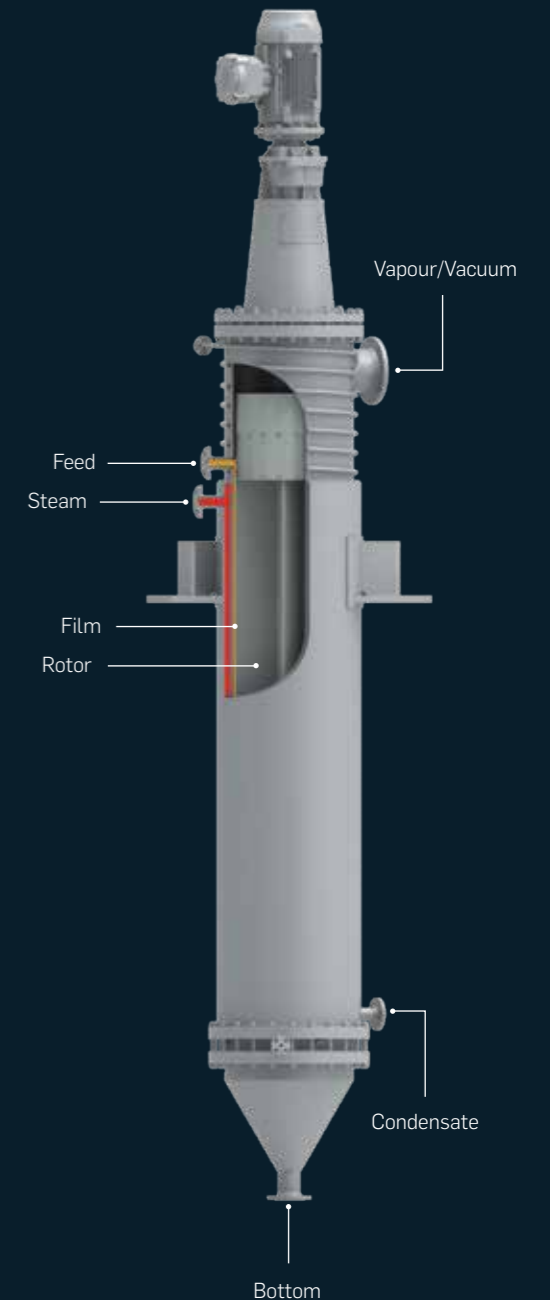
ATFE can operate at pressures of 1 mbar and above. The jacket side heating medium temperature can be up to 400°C.

Applications

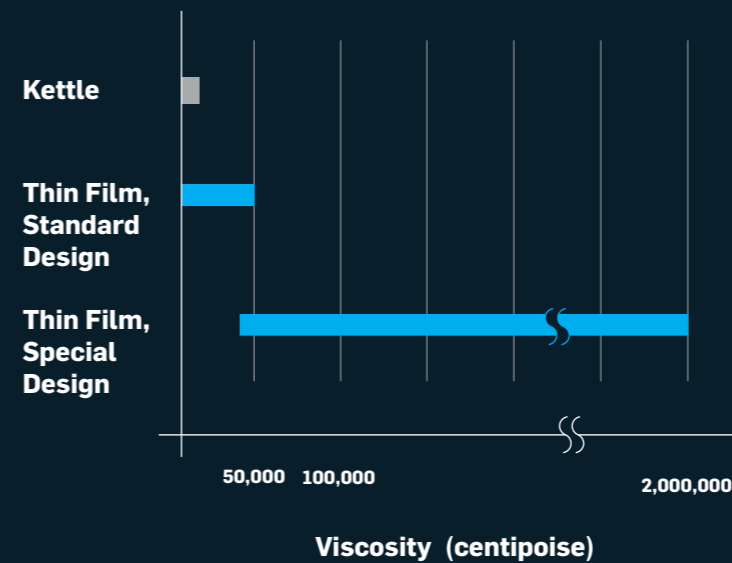
Vacuum distillation of bulk drugs, intermediates, fine chemicals, glycols, used lubricating oils, fatty acids, amines and esters.

Concentration of oleoresins, enzymes, bulk drugs, plant extracts, juices and sugars.

Stripping of silicone oils, pesticides, plasticizers and monomers from polymers.



Viscosity Handling Capability



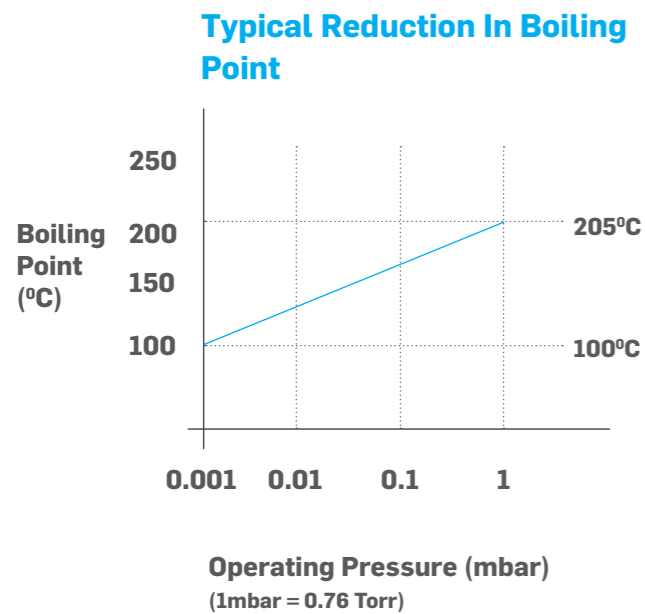
Short Path Distillation Unit (SPDU)

Also known as molecular distillation, the configuration with an internal condenser eliminates pressure drop between the heated film and the condenser surface. Thus, it can be operated at pressures down to 0.001 mbar.

The wiper basket with a splash guard enhances the distillate quality by minimizing carry over in the distillate. Operating temperature in the jacket can be up to 400°C

Applications

Vacuum distillation of natural and synthetic vitamins, esters, bulk drugs, tocotrienols, tocopherols, fish oil, omega 3 fatty acids, glycerides, fine chemicals, silicone oils, natural and synthetic waxes, epoxy resins and used lubricating oil.



Agitated Thin Film Dryer (ATFD)

The feed material passes through phases of liquid, slurry, paste, wet powder and finally dry powder while in the form of an agitated thin film.

ATFD has two configurations, vertical and horizontal. The vertical dryer accepts feed in solution and slurry form. The horizontal dryer, along with solution and slurry, also accepts feed in paste or wet powder form. Thus dilution of feeds is avoided arising from such limitations.

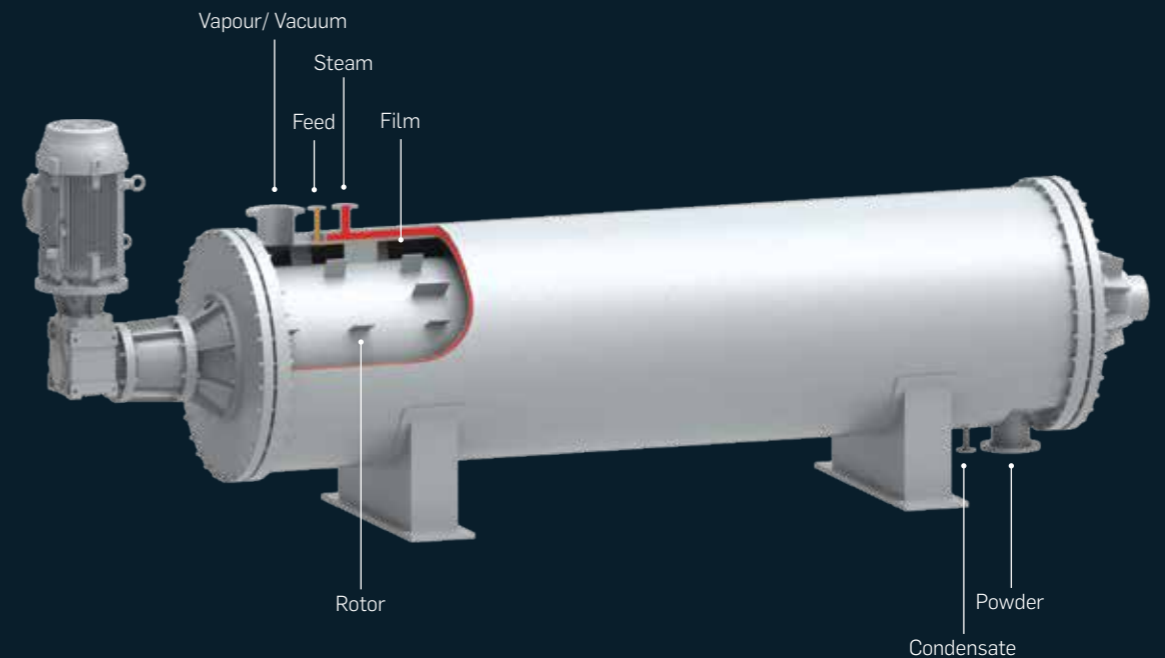
Absence of air makes it suitable for oxygen sensitive products.

Powders are of uniform consistency, free from large agglomerates or grits.

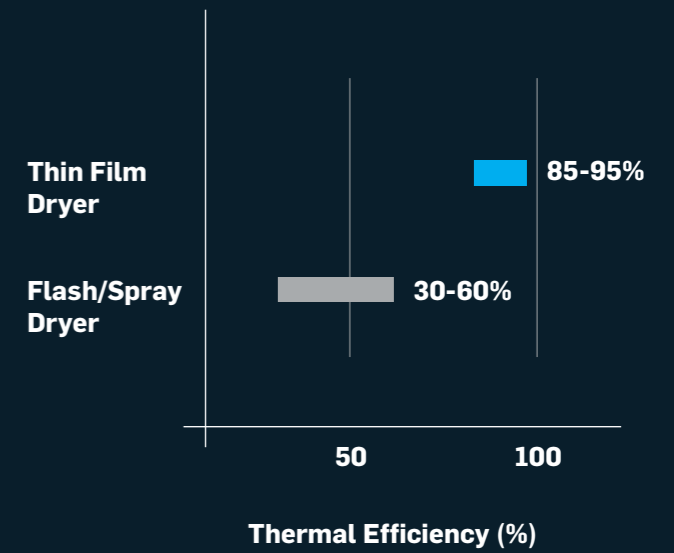
Continuous discharge of powder from vacuum is possible.

Applications

Drying of bulk drugs and intermediates, dyes and pigments, value added food products, clean room applications, possibility of amorphous powders.



Thermal Efficiency of Dryers



We also offer

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