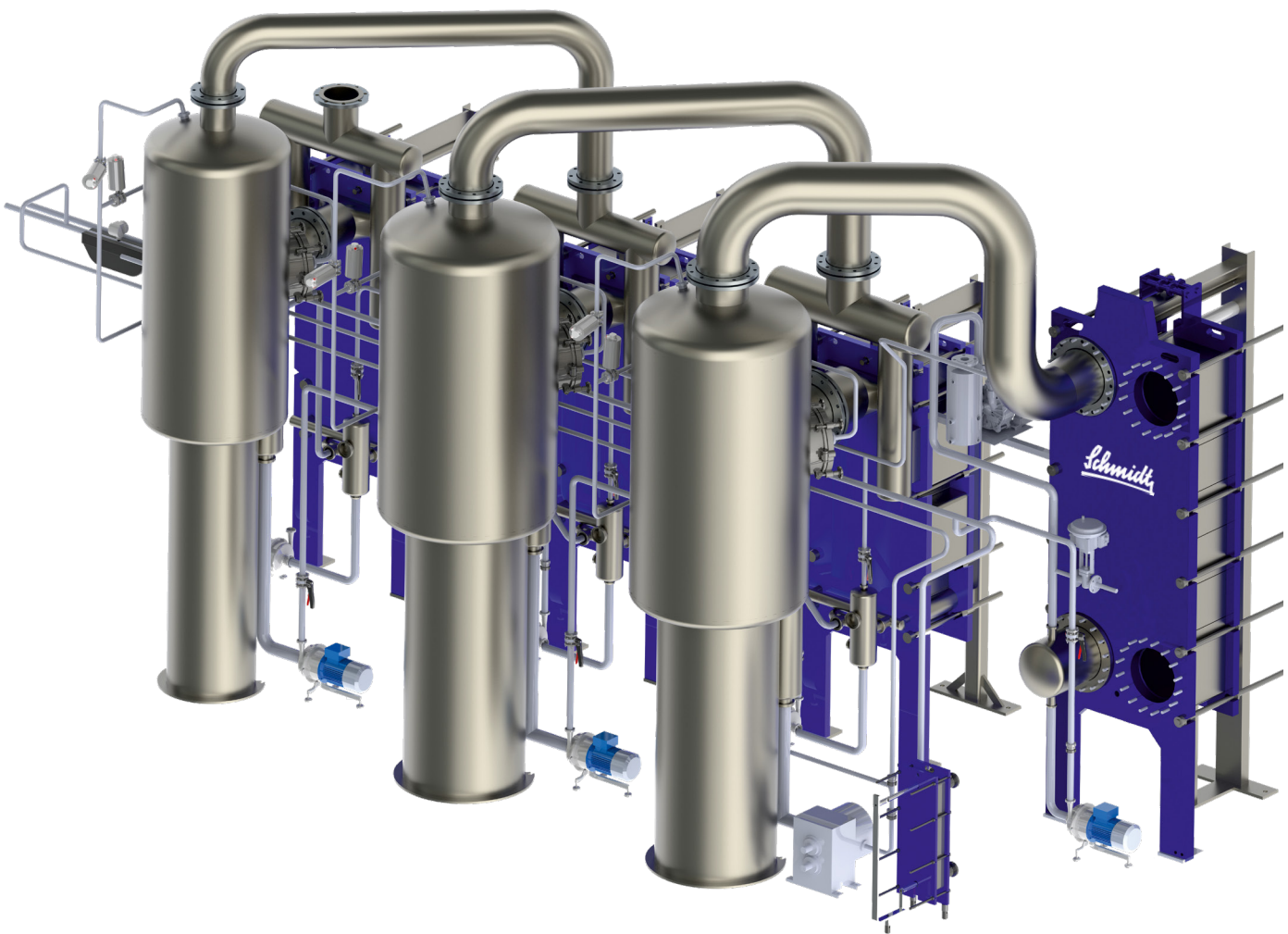


System Solutions

System Solutions for Evaporating Technology



Evaporation Application

API evaporating systems with our best in class SIGMASTAR® plate evaporators are utilized successfully in the food industry, in the organic and chemical industries as well as in wastewater treatment.

SIGMASTAR® plate evaporators offer superior performance, handling a diverse range of products, including viscous fluids, purée, and liquids with fouling tendencies that cannot be processed with falling film evaporator technology.



Beverage

- Juice
- Coffee
- Dairy
- Tea

Foods

- Fruit Puree
- Meat Broth
- Jams/Jellies
- Candy

Protein

- Collage Peptide
- Meats
- Gelatin
- Fertilizer

Sugars & Starches

- Corn Mash
- Sweeteners
- Potatoes
- Infusion Syrups

Extracts

- Cannabis
- Herbal
- Nutraceuticals
- Plant

Technical Versions

MATERIALS AND SPECIFICATIONS

Plate Materials	All prevalent stainless steel, Titanium, Titan Pd, Hastelloy*
Gasket Materials	EPDM, NBR, FPM*
Versions	-1 to 16 bar*
Exchanges Surface	SIGMASTAR®: 0.45 -1.5 m ² per plate
SIGMASTAR® Range	45V, 90V, 150V

CAPACITY DATA

Feed Capacity	0.5 t/h to 120 t/h
Evaporating Capacity	500 kg/h to 75000 kg/h
Evaporating	In excess of 99% dry substance**
Specific Steam Consumption	1.0 to 0.15 kg steam per kg evaporation
Viscosity	to 2500 mPas**
Heating System	Direct steam or thermal or mechanical vapor compression

* dependent on design -

** dependent on product

API Solution

LOWEST TOTAL COST OF OWNERSHIP

Our overall system solution factors in minimizing: utility consumption, ease of maintenance, future upgrades, operational performance, and installed costs

RISING FILM TECHNOLOGY

Superior design for problematic products (highly viscous, slurries, and liquids with fouling tendencies). Applications not possible in falling film designs.

MODULAR DESIGN

Designed with capacity and product changes in mind. Capable of handling a variety of products in same system and can easily add capacity when needed.

BESPOKE DESIGN

Designed around your requirements and optimized for a total cost of ownership approach.

HIGHEST PERFORMANCE

Can process in excess of 80 °Brix and can evaporate up to 99% in compact design.

EXPERTISE

60+ years supplying evaporation systems in Sanitary markets. API brings the knowledge and experience to design these challenging systems.

SIGMASTAR® Technology

SUPERIOR PRODUCT DISTRIBUTION

As product boils and rises, fresh product is pulled into the plates independent of feed rate. Allows flexibility to meet turndown demands

SHORT RESIDENCE TIME

High product velocity and short distance equates to product times less than a second which ensures gentle treatment of the product. Less CIP chemicals.

HIGH VAPOR VELOCITY

Allows for high concentrations and viscosities

LOW PRESSURE LOSSES

Short tube lengths in the plate minimize pressure drop which minimizes utility consumption costs

SIMULTANEOUS PRODUCT PROCESSING

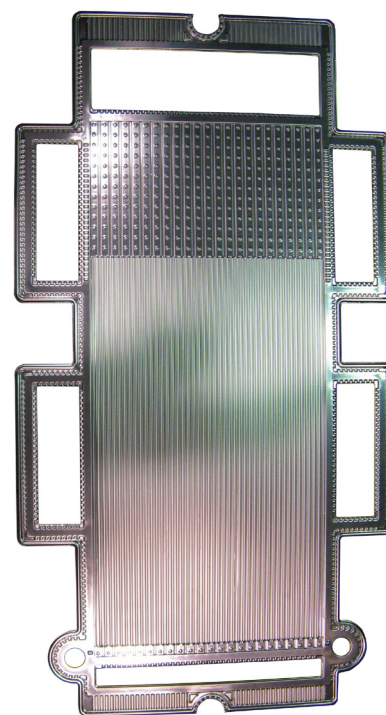
A variation of the plates allows for two (2) products to be processed simultaneously.

CAPACITY UPGRADES

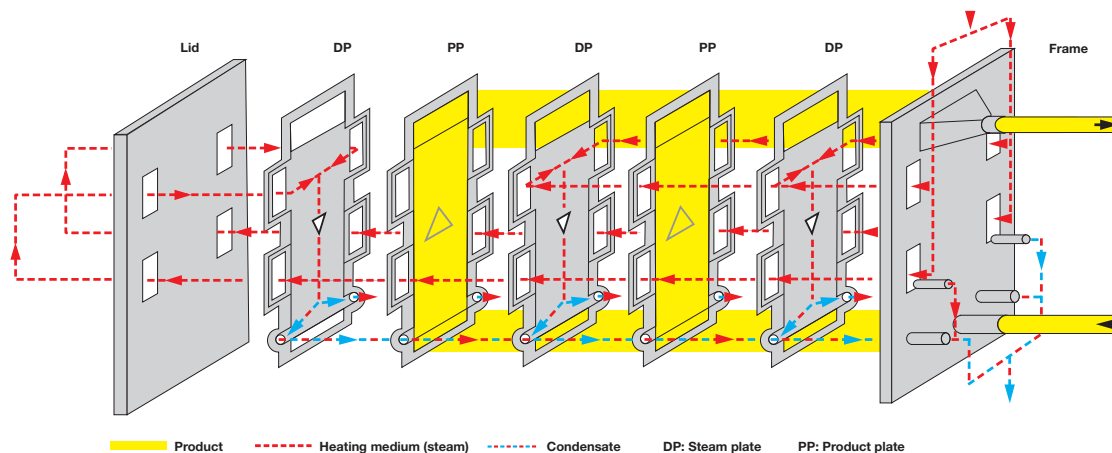
Capacity can easily be adjusted up or down by varying the number of plates.

ECONOMICAL DESIGN

The most economical solution based on thermal transfer surface compared to size and weight, and to % concentration capability



SIGMASTAR® 90V Evaporator Plate



Design Optimization

Evaporation is an energy intensive and costly process regardless of the technology used.

Optimized Configured Solution

SINGLE VS MULTIPLE EFFECT

Single

- Highest consumption of steam usage
- Steam usage is the same as water evaporated
- Lower initial installed cost
- Higher operational cost

Multiple

- Same heat is used multiple times
- Each 'effect' added, the water evaporated is decreased. 2:1 for two effect, 3:1 for three effect, etc.
- Higher initial installed cost
- Lower operational costs

VAPOR RECOMPRESSION

Thermal (VTR)

- High pressure steam to enhance steam efficiencies
- A 3-effect system with TVR is equivalent to 4-effect system

Mechanical (MVR)

- Utilize compressors to increase pressure of process vapor to reuse as heating medium
- Allows for near complete energy recovery of steam consumption
- Electricity costs increase



MODULAR SKID OPTION

Skid designs offer following advantages:

- Quick installation and start up
- Plug & play technology
- Easy to move
- Clearly defined measurements
- Available in special materials
- Multiple skids can be combined

Upgrades to Existing Equipment



FINISHER EFFECT

Cost Reduction

- Reduction in fouling
- Longer maintenance interval
- Reduction in labor and cleaning

Performance

- Smoother steady state operation
- Operates at lower temperature
- Increase quality of product

Cost Reduction

- Achieve higher concentration
- More viscous products
- Additional capacity



AROMA RECOVERY UNIT

Yield Improvement

- Higher yields of aroma vapors due to low temperature vacuum rectification
- Split feed system extracts freshest and most natural flavors

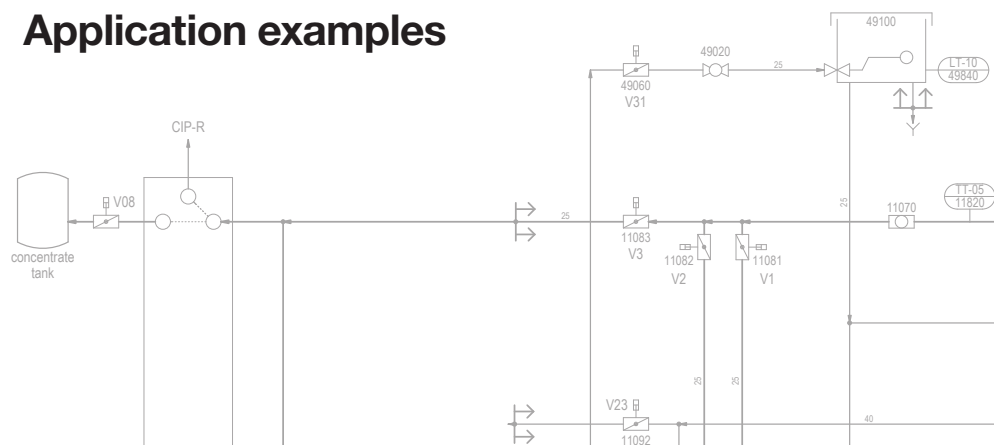
Performance

- Higher operating efficiency by varying product reflux and liquid recirculation
- More effective vapor process to easily remove unwanted vapors

Versatility

- Up to 300 aromas producible for blending with feed or external use
- Optimal performance at different boiling pressures and capacities

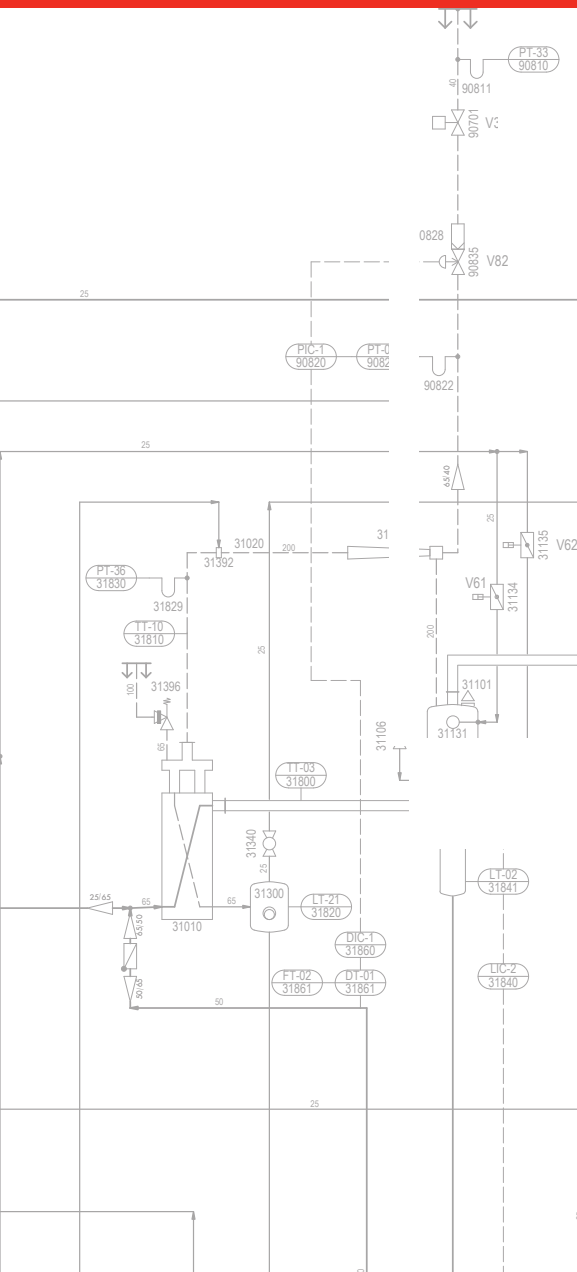
Application examples



2-stage SIGMASTAR® 90V Evaporating Plant
protein hydrolyzate - evaporating capacity 2,000 kg/h



5-stage SIGMASTAR® 90V Evaporating Plant with thermal vapor compressor
for apple juice - evaporating capacity 20,000 kg/h



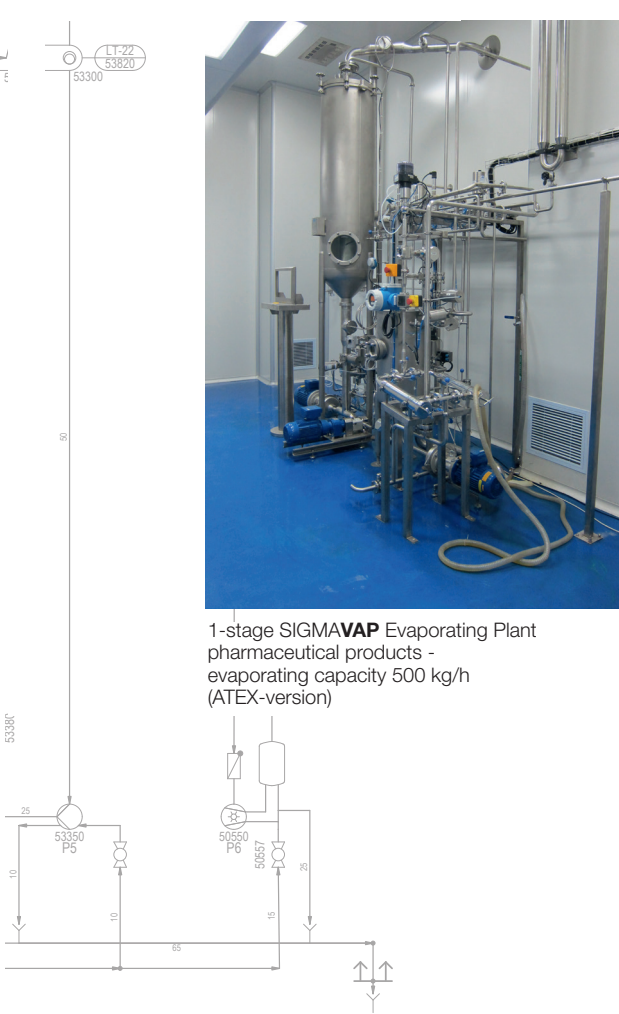
2-stage SIGMASTAR® 90V Evaporating Plant
plant extracts - evaporating capacity 3,000 kg/h



1-stage SIGMAVAP Pilot Plant
various products - evaporating capacity up to 50 kg/h




1-stage SIGMAVAP Evaporating Plant
pharmaceutical products -
evaporating capacity 500 kg/h
(ATEX-version)



Order No.:		Best./Customer:	
Freigegeben/Adress:		Gepr./Approved:	
Entst./Drawn:		Zeichnungs-Nr./Drawing No.:	
Benennung:		Skizzen/Scale:	
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Schutzvermerk nach DIN 24 beachten		Copyright reserved	



API Heat Transfer, a family of high-performance brands 

High-performance heat transfer.

It's who we are and what we do. It's part of our 140-year heritage designing and delivering world-class heat transfer products for nearly every industry. It's bolstered by our worldwide network of manufacturing facilities that provide sales, service, and support. And it's ingrained in a process that has helped customers around the world for nearly a century and a half.

When you work with us, you'll find the performance of our technologies sets the bar for heat transfer products, and our relentless drive to find and create custom heat transfer solutions to meet any industry challenge sets us apart.

See how our performance can improve yours.

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