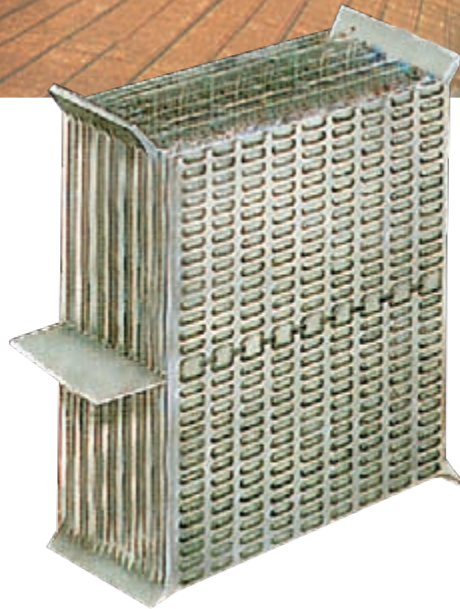
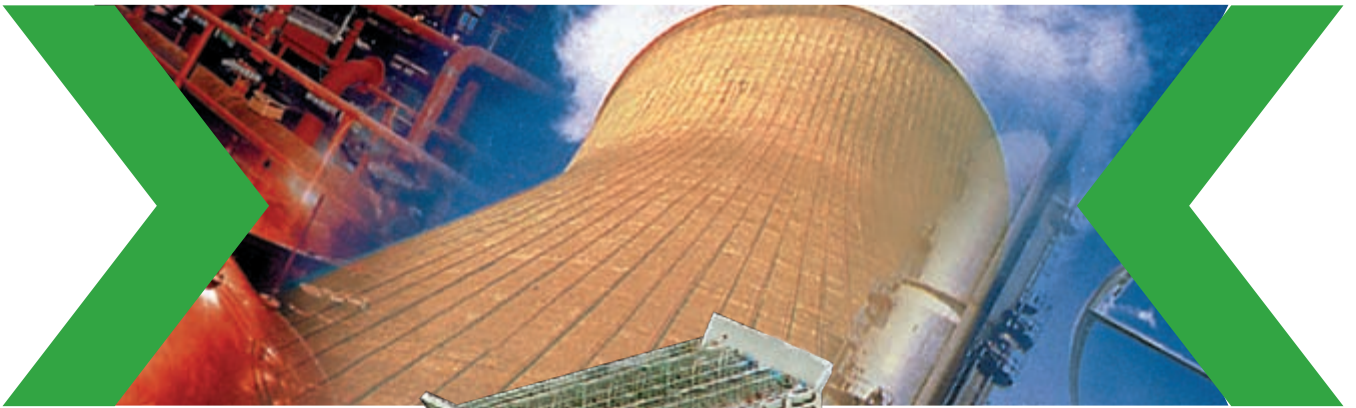
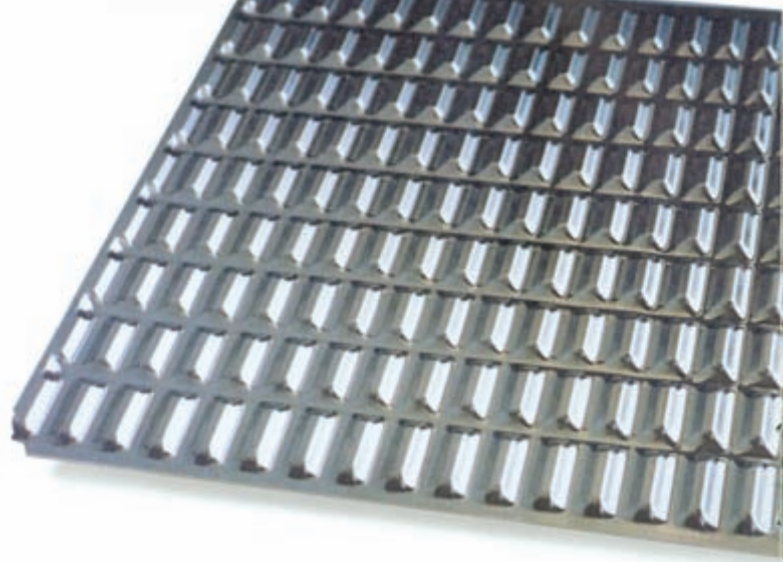




# APV Hybrid Welded Plate Heat Exchanger

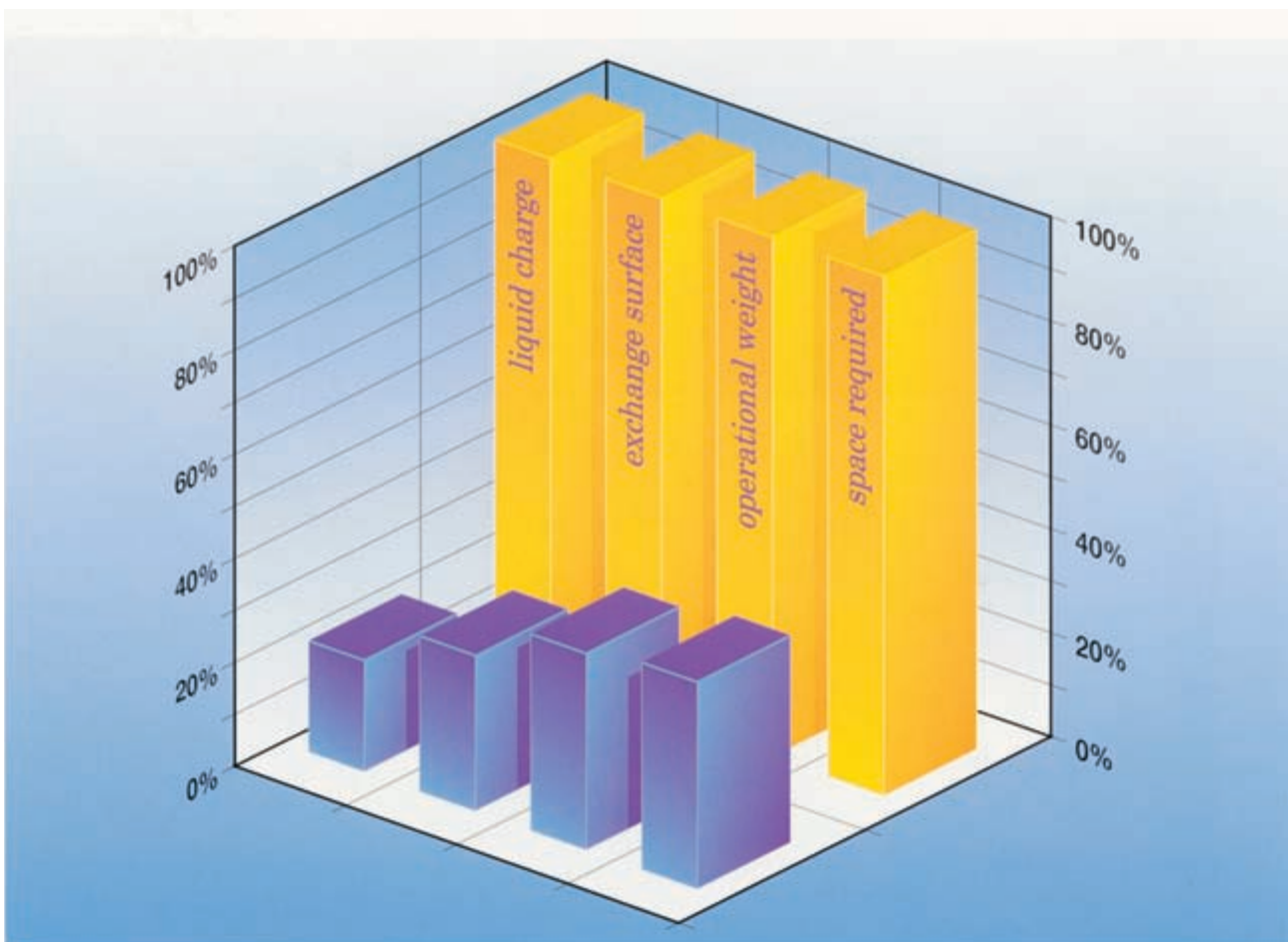


# The Technology and its benefits



APV's Hybrid fully-welded heat exchanger unit offers a broad range of configuration options to optimize performance for a variety of thermal, physical and geometrical conditions. The fully welded APV HYBRID plate heat exchanger safely prevents cross contamination – even at higher pressures and temperatures. This means that the unit can be used for a wider range of applications than conventional plate and frame heat exchangers.

The APV HYBRID heat exchanger delivers many process engineering advantages when compared to shell & tube heat exchangers. Its compact design allows a heating surface density of up to 250 m<sup>2</sup>/m<sup>3</sup> (76 ft<sup>2</sup>/ft<sup>3</sup>). The unique flow pattern design ensures enhanced gas and liquid heat transfer as well as significant savings on material costs due to enhanced operating efficiency.



Hybrid



Shell & tube exchanger

# Functionality



The extremely efficient use of the plate surface maximizes the heat transfer area, thus optimizing heat transfer performance. The elimination of dead spots provides for very efficient heat transfer at low pressure drop values, enabling a closer temperature approach.

The plate side flow and the tube side flow are arranged in a cross-flow configuration with one or multiple passes over the plates. The plate pattern forms elliptical tube channels on the tube flow side and wave flow passage on the plate side.

Larger plate gaps are available to accommodate higher flow rates, reduced pressure drops, and media with larger particulates.

This facilitates optimum design for a wide range of process requirements.

The APV HYBRID plate heat exchanger can be designed for a pressure range from full vacuum to 40 barg (580 psig).



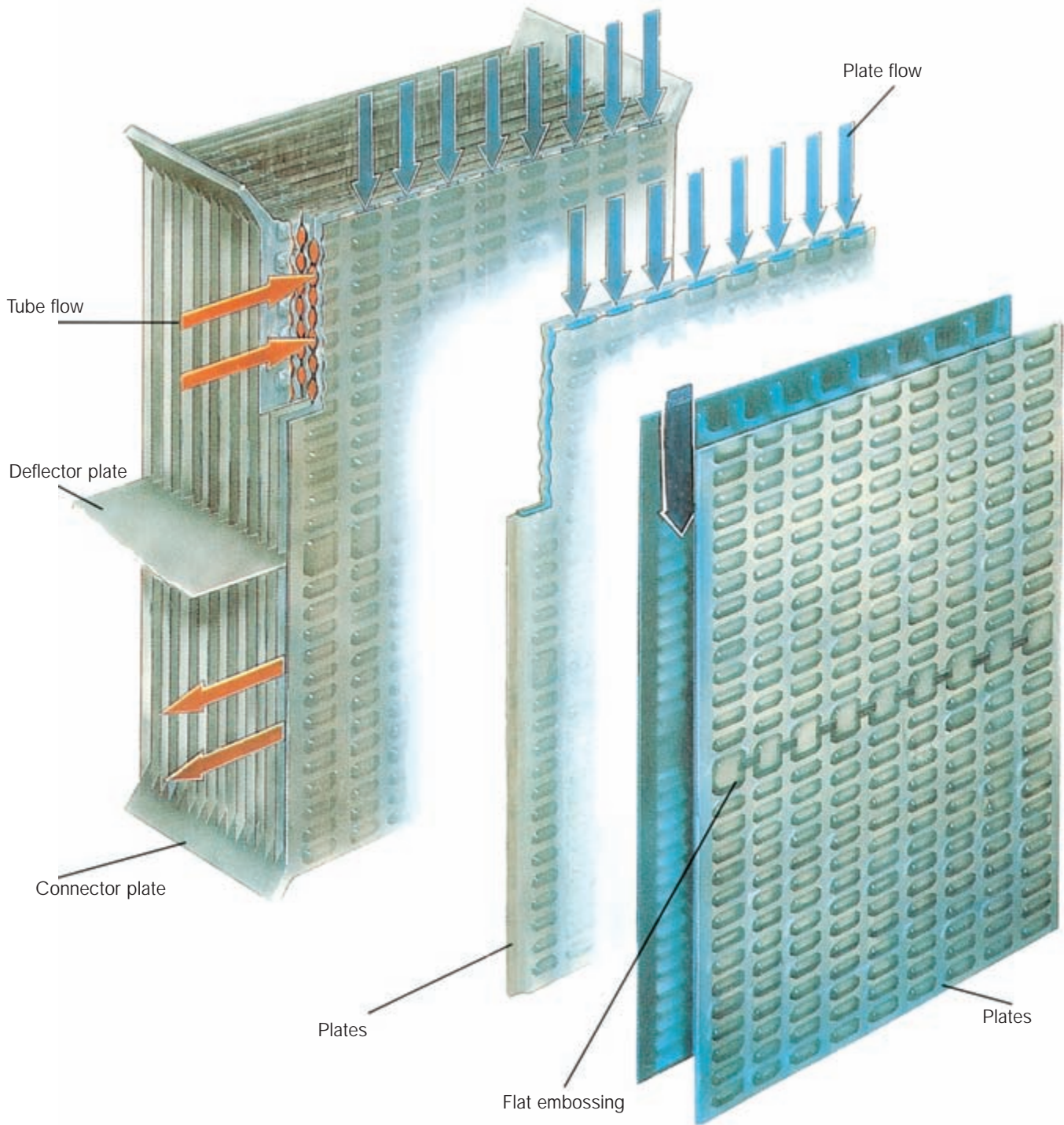
APV HYBRID platepack cut showing tube and corrugated plate sides



APV HYBRID platepack cut showing tube and corrugated plate sides

# Construction

The heart of the APV HYBRID heat exchanger is a heat exchanger block consisting of one or more plate packs. The dimensions of the plate packs are determined by the length and number of plates included in the plate pack. Plates are welded together to form one or more gas-tight and pressure-resistant blocks. Maximum area in a unit is 8,000 m<sup>2</sup> (86,000 ft<sup>2</sup>). Plate thickness is determined by process requirements (typically 0.6 – 0.8 mm).



# Applications

The APV HYBRID plate heat exchanger offers the best technology solution for a wide number of applications while delivering an excellent return on investment.

## APV HYBRID without phase change:

- ◆ Gas-gas heat exchanger
- ◆ Gas-liquid heat exchanger
- ◆ Liquid-liquid heat exchanger

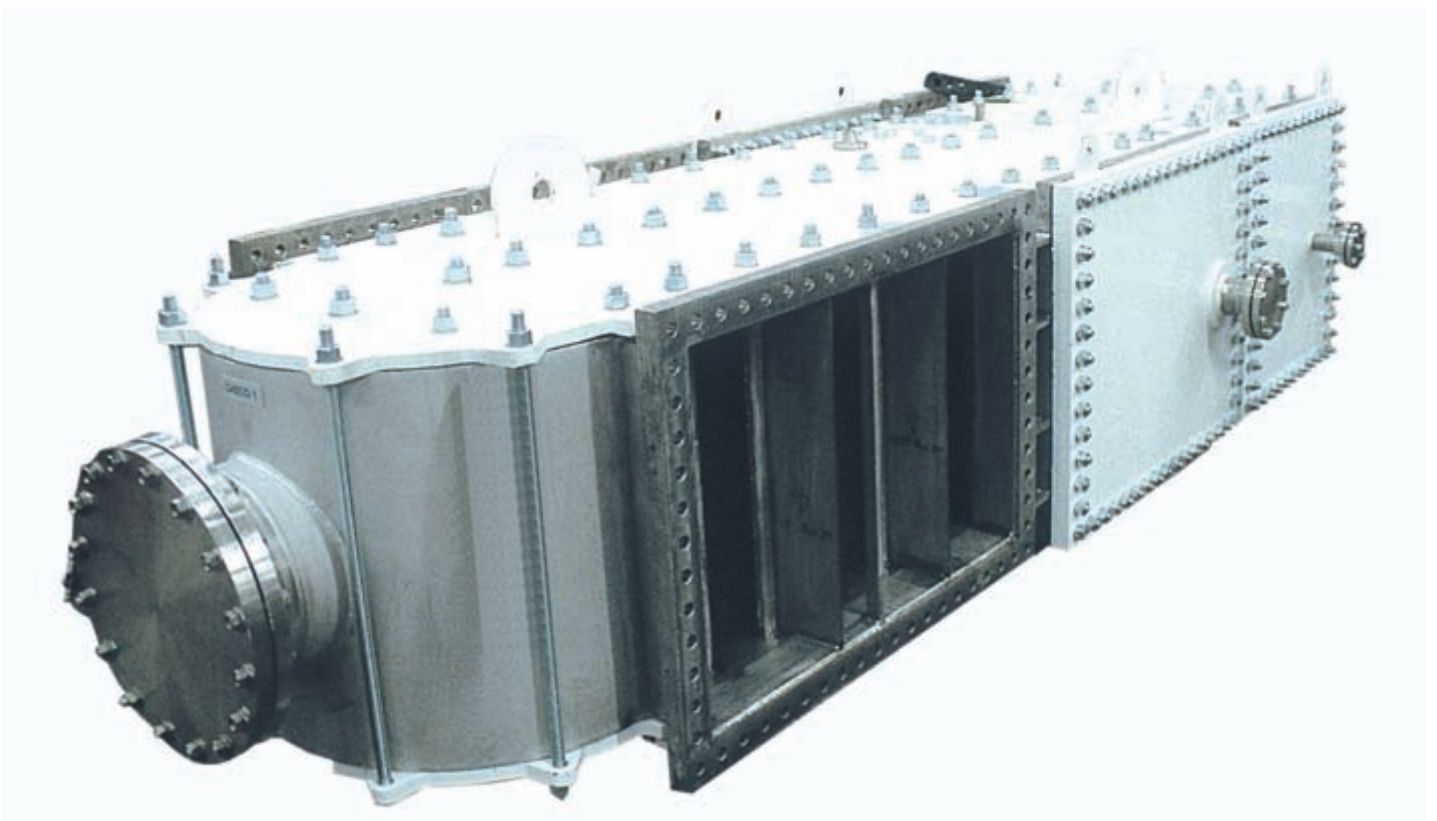
## APV HYBRID with phase change:

- ◆ Falling film evaporator
- ◆ Flooded evaporator
- ◆ Condenser
- ◆ Process condenser

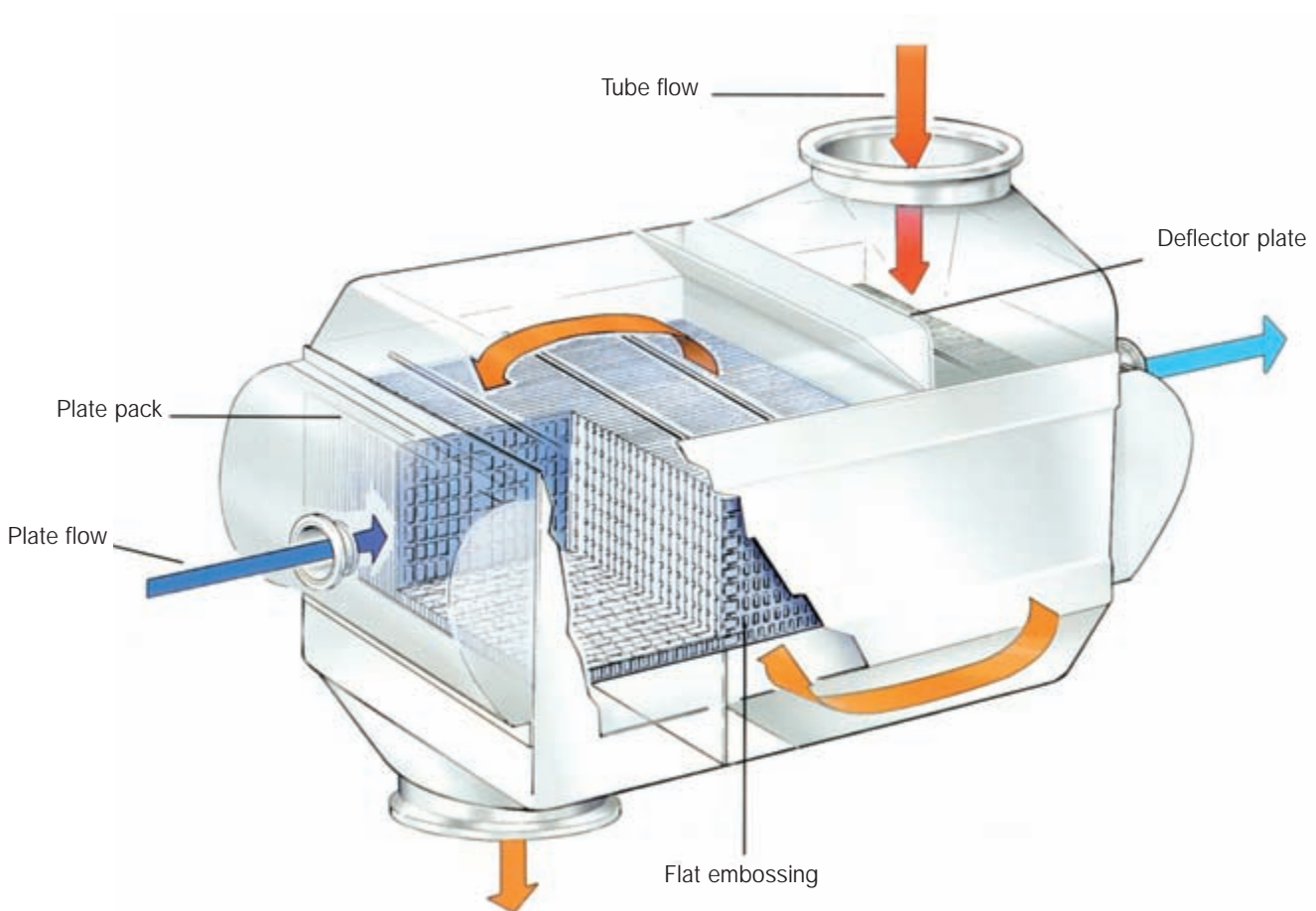
The APV HYBRID heat exchanger eliminates several common thermal process engineering challenges.

APV HYBRID technology is field proven with successful installations in a wide range of industries such as:

- Power generation
- Oil & gas
- Petrochemical & chemical
- Sugar



# Features & advantages



Like all APV products, the APV HYBRID plate heat exchanger is designed and built in accordance with the ISO 9000 quality assurance norm.

## Features:

- Operational temperature range: Between  $-10^{\circ}\text{C}$  to  $+350^{\circ}\text{C}$  ( $14^{\circ}\text{F}$  to  $662^{\circ}\text{F}$ )
- Pressure range: Between vacuum and 40 barg (580 psig)
- Plate thickness, typically: 0.6 – 0.8 mm
- Heating surface per unit: Up to  $8,000\text{ m}^2$  ( $86,000\text{ ft}^2$ )
- Material: Available in a variety of standard and high-grade alloys
- Customized solutions and special specifications outside standard working range available on request
- Design according to: ASME, PED, SQL

## Advantages:

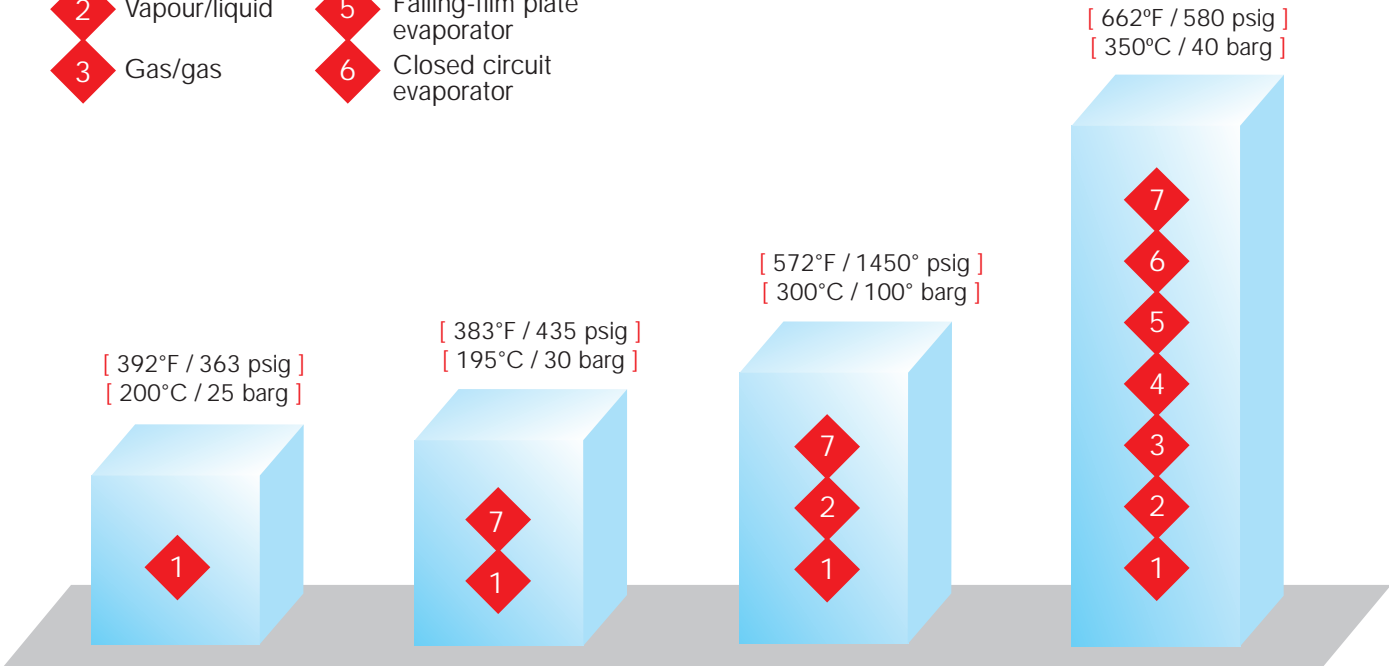
- Economic solution - compact design providing larger duties in a single unit
- Extremely good temperature approach for maximum thermal efficiency
- Very efficient heat transfer even at low pressure drop
- Customized design to fit specific process and space requirements
- Self-cleaning effect preventing fouling
- Service-friendly, mechanical cleaning and visual inspection possible
- Low service costs – reliability and limited maintenance

# The APV Heat Exchanger Product Portfolio

## Suitability by heat exchanger technology

Applications:

- ◆ 1 Liquid/liquid
- ◆ 4 Gas/liquid
- ◆ 7 Condenser
- ◆ 2 Vapour/liquid
- ◆ 5 Falling-film plate evaporator
- ◆ 6 Closed circuit evaporator
- ◆ 3 Gas/gas




**APV ParaFlow**  
Gasketed plate heat exchangers

**APV ParaBrazed**  
Brazen plate heat exchangers

**APV ParaTube**  
Tubular heat exchangers


**APV Hybrid**  
Fully welded plate heat exchangers



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