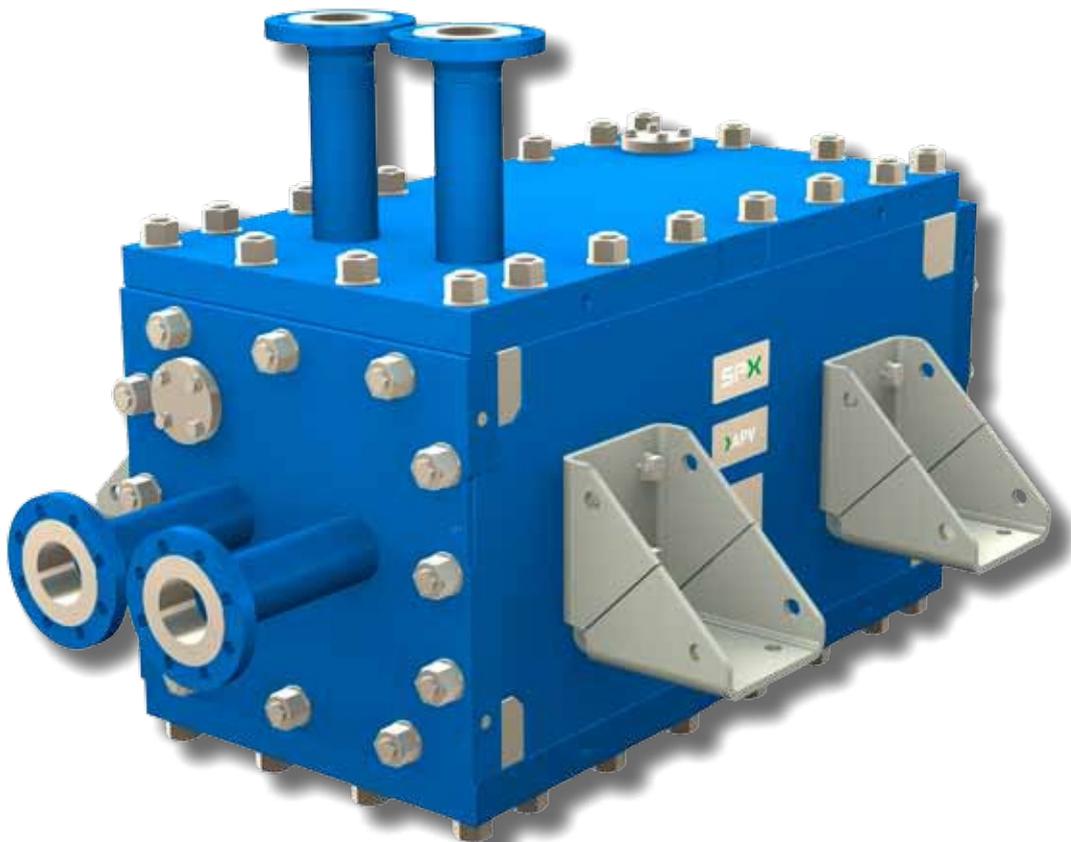


# APV Hybrid - Welded Heat Exchanger

WITH MULTI-FLEXIBLE CONFIGURATION FOR ROBUST AND EFFICIENT HEAT TRANSFER



## About APV

SPX provides advanced APV heat transfer solutions for cooling, heating, condensing and evaporation of process fluids - designed to solve heat transfer process challenges in a vast array of industries. They are designed to meet demanding process conditions and to optimize the utilisation of energy. APV heat transfer solutions have proven reliable and highly efficient helping customers worldwide to run their processes safely and economically.

Since APV invented the plate heat exchanger in 1923 we have been pioneering applicable technology in pressing, shaping, welding, sealing and testing steel. Dedicated and specialized SPX staff around the world is committed to design and provide efficient and durable heat transfer solutions to help customers optimize energy utilization and minimize downtime for improved profitability.

## Choosing the right Heat Exchanger can be a complex matter

### HOW CAN ONE SINGLE HEAT EXCHANGER TECHNOLOGY COVER ALL YOUR KEY PRIORITIES?

- In a complex decision process, neglecting key priorities may lead to low performance or even plant failure – things you would re-do if you could.
- With more than a century of heat exchanger experience, SPX knows the needs and priorities of most industries.
- Let SPX guide you through complex choices to the right solution for your specific application and needs.

### IF THESE ARE SOME OF YOUR PRIORITIES...

	WHAT COULD HAPPEN IF YOU COMPROMISE HERE?	WHAT CAN YOU EXPECT FROM SPX AND HYBRID?
<b>Very high working temperature, (including temperature shocks)</b>	Equipment failure/ replacement	Longer production uptime
<b>Very high working pressure (including pressure shocks)</b>	Equipment failure/ replacement	Longer production uptime
<b>Small footprint</b>	High conversion/ engineering costs	Cost savings, accessibility
<b>High heat recovery, extreme small log mean temperature difference</b>	Higher running costs	Cost savings, lower CO <sub>2</sub> footprint
<b>Cleanability, manual and CIP</b>	Reduced efficiency	Operation at desired specification after cleaning
<b>Resistance to corrosion</b>	Equipment failure/ replacement	Long service life

### ... HYBRID IS FOR YOU!

Based on a multi-flexible configuration platform, Hybrid is designed to operate under harsh conditions where other heat exchanger technologies can fail, have a shorter operating lifetime, or reduce operational efficiency.

What's more, easy access makes high-pressure cleaning of Hybrid plates simple, effective and fast!

# The heart of the matter

The central plate core is contained by 4 movable pressure panels, and the 2 flows are separated by the plate wall and 4 corner bars.

## GENERAL USE

- 4 350°C (662°F)
- 4 Up to 40 barg design pressure (580 psig)
- 4 Corrosive media
- 4 Gas/steam/air with low pressure drop
- 4 Pass-through of particles/solid

# Typical product applications

## Oil and Gas

- Gas sweetening
- Gas Dehydration
- Crude oil stabilizer
- Crude oil heater



## Chemical

- Solution cooler and heater
- Process condenser
- Cryogenic chiller



## Power

- Steam condenser
- District heating units



## Industrial

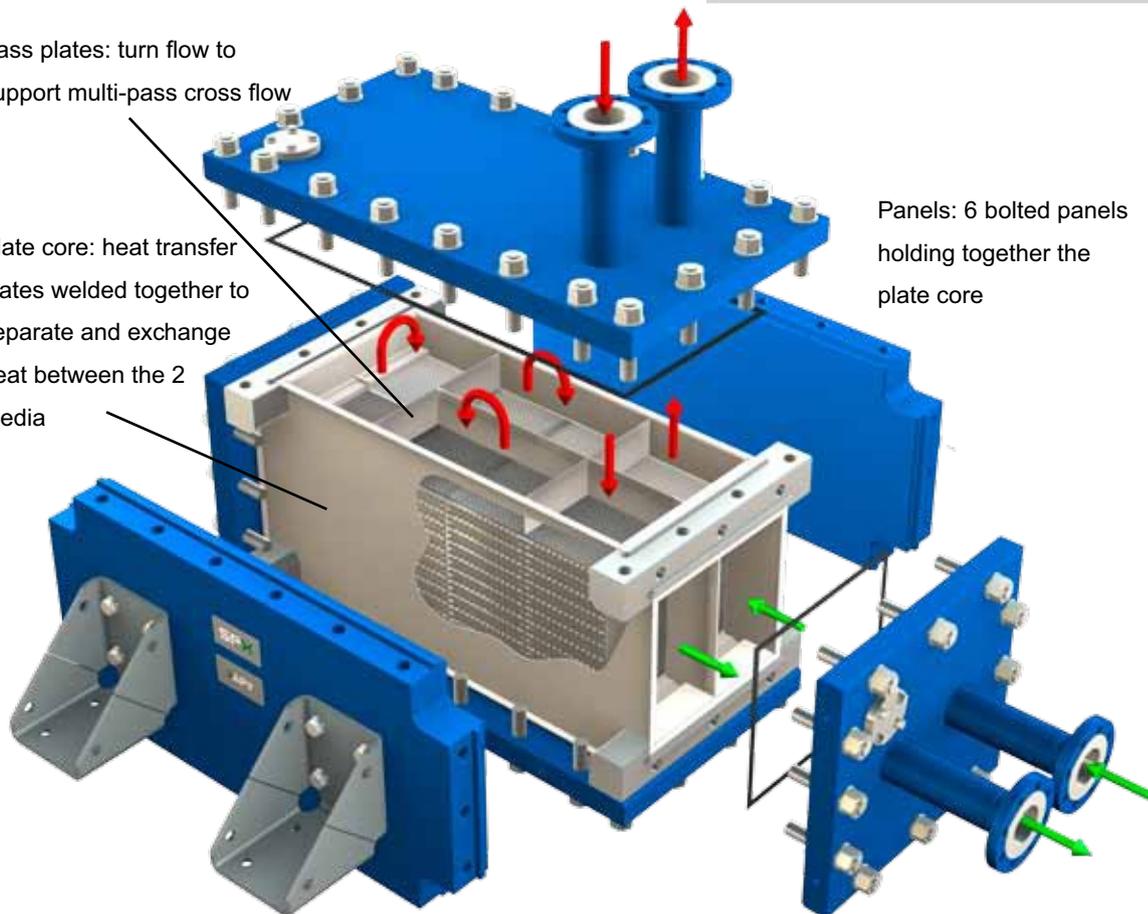
- Reboiler



Pass plates: turn flow to support multi-pass cross flow

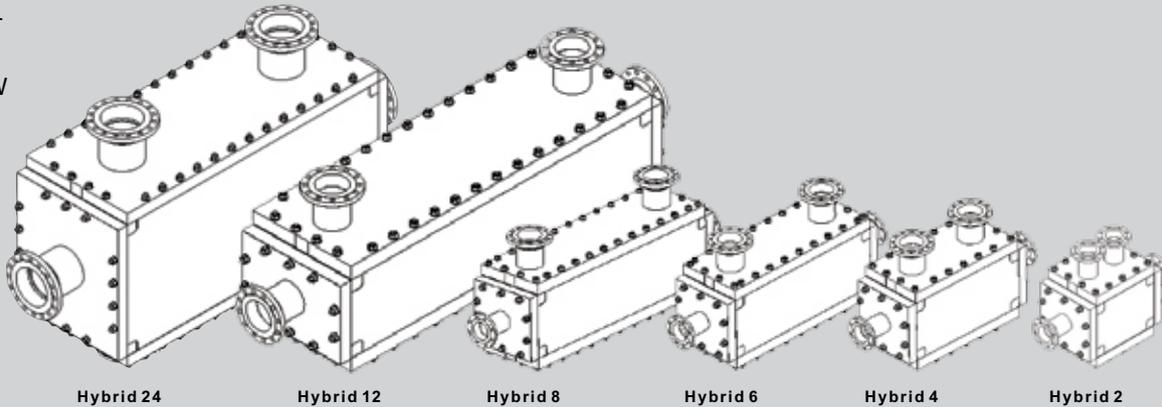
Plate core: heat transfer plates welded together to separate and exchange heat between the 2 media

Panels: 6 bolted panels holding together the plate core



## 6 BASIC MODELS

H



MODEL	24	12	8	6	4	2
Height mm (Inch)	1450 (57)	1050 (41)	1050 (41)	1050 (41)	1050 (41)	1050 (41)
Length mm (Inch)	3300 - 3575 (130 - 141)	3300 - 3575 (130 - 141)	2440 - 2710 (96 - 107)	2010 - 2280 (79 - 90)	1580 - 1850 (62 - 73)	1150 - 1425 (45 - 56)
Width mm (Inch)	715 - 1075 (28 - 42)	715 - 1075 (28 - 42)	610 - 785 (24 - 31)	610 - 785 (24 - 31)	610 - 785 (24 - 31)	390 - 785 (15 - 31)

**Note:** Dimensions are approximate and may vary as per specific model configuration.  
The APV Hybrid can be mounted horizontal or vertical.

## ... to meet all your needs

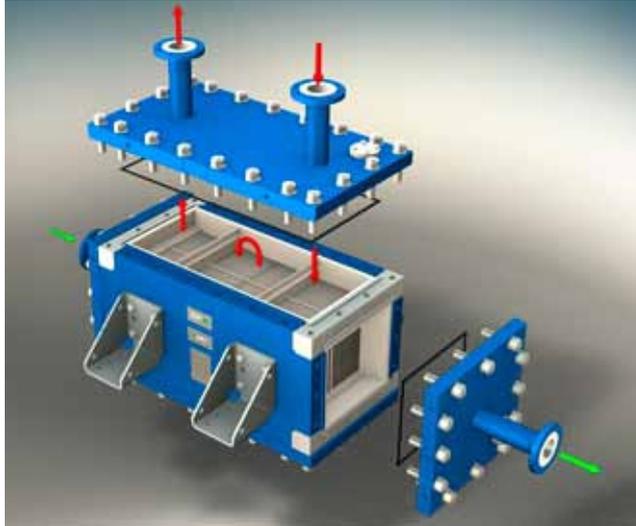
- We will always find the perfect solution
- Perfect adaptability for almost any application
- Full utilisation of pressure drop to maximise thermal efficiency
- Close temperature approach of both media, down to 1°C possible (1.8°F)
- Low pressure drop possible – even at high mass flows – even for gas/steam
- Perfect for condensation and evaporation (including vacuum condensation)
- Large connection sizes possible
- Non-symmetric flows handled, even with perfect pressure drop utilisation



# Unseen flexibility based on a range of standard variants...

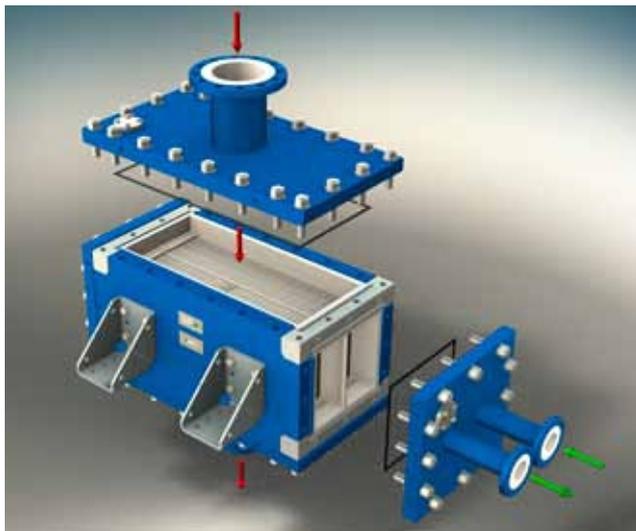
EACH AVAILABLE IN VARIOUS STANDARD CONFIGURATIONS:

EXAMPLE 1



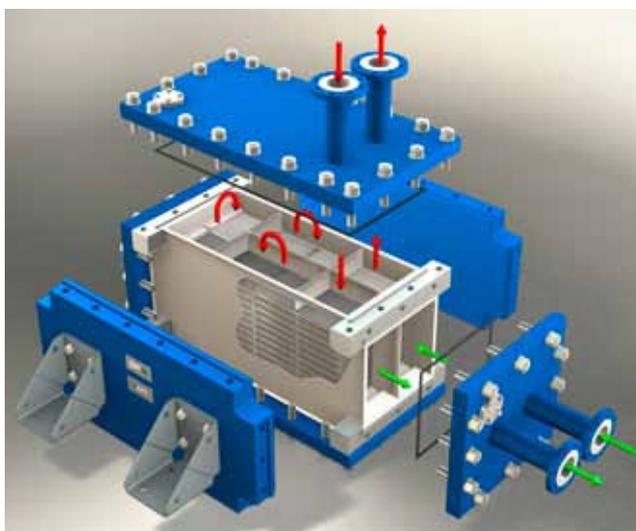
Low number of passes on tube side in combination with single pass on corrugated side system for low NTU value applications and/or low pressure drop requirements

EXAMPLE 2



Single pass on tube side in combination with multiple passes on corrugated side for multiphase applications (e.g. condensation)

EXAMPLE 3

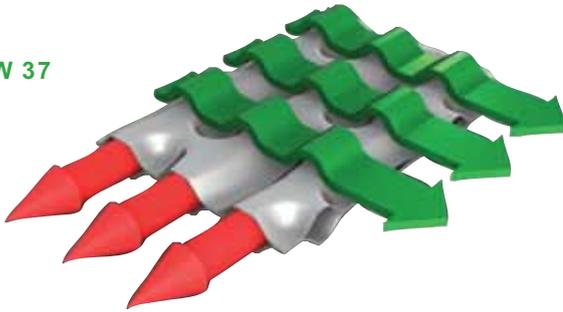


High number of passes on tube side in combination with corrugated multiple passes for close temperature approach applications (heat recovery)

## 3 plate variants – depending on your needs

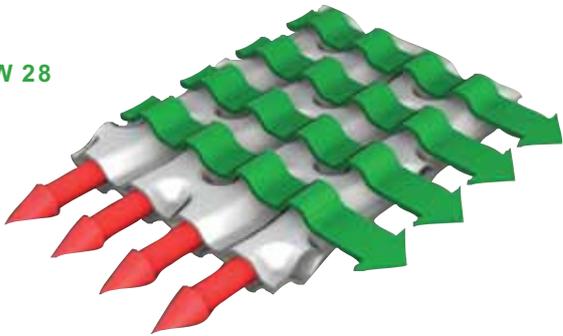
HYBRID FEATURES 3 VERY DIFFERENT PLATE TYPES!

TUPLAFLOW 37



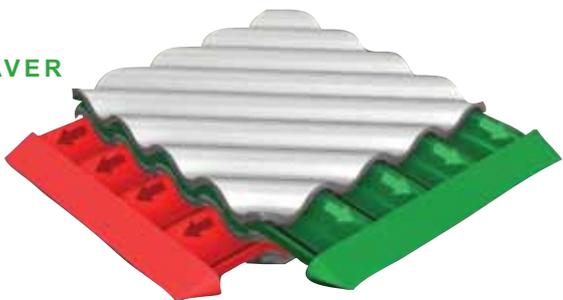
- If manual cleaning and/or low pressure drop are essential (e.g. steam/gas).
- Pressure drop on tube side can be kept extremely low
- Excellent for gas/steam
- Excellent mechanical cleanability combined with high heat transfer performance

TUPLAFLOW 28

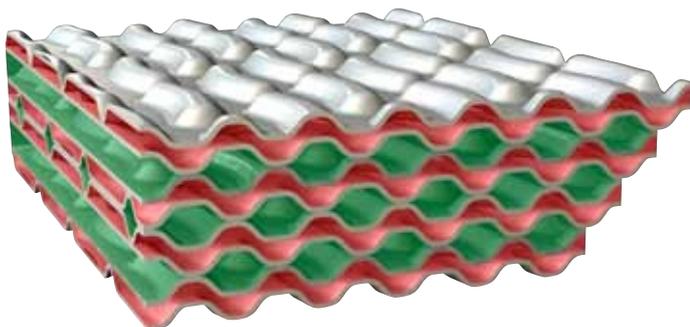


- If you want the best combination in between.
- Good mechanical cleanability combined with excellent heat transfer performance

ENERGY SAVER



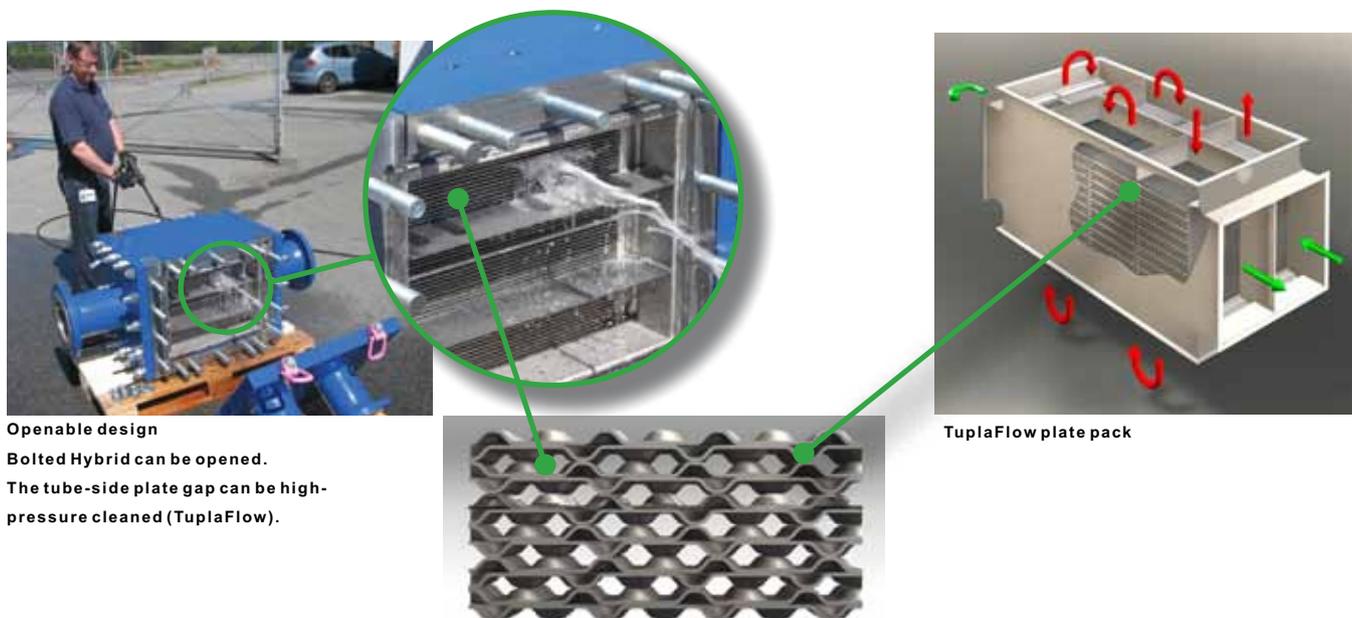
- If your focus is optimum efficiency and pressure drop limitations are not an issue.
- High turbulence
- Highest efficiency
- Highest pressure resistance



- Cross section of TuplaFlow plate types
- All plates are cross-flow

# Do fouling or scaling impact your production planning?

- Spare capacity, filter systems or CIP cleaning systems are expensive to install.
- 2 of the 3 plate options can be cleaned effectively using manual high pressure cleaning.



**Openable design**  
**Bolted Hybrid can be opened.**  
**The tube-side plate gap can be high-pressure cleaned (TuplaFlow).**

**TuplaFlow plate pack**

## HUGE FLEXIBILITY BASED ON STANDARD VARIANTS

MODEL	24	12	8	6	4	2
Heat transfer in m <sup>2</sup> (ft <sup>2</sup> )	170-464 (1830-4995)	85-232 (915-2498)	45-103 (484-1109)	34-77 (366-829)	22-51 (237-549)	5-26 (54-280)
Max. nozzle size Tube side	DN500 20"	DN450 18"	DN450 18"	DN300 12"	DN300 12"	DN450 18"
Max. nozzle size Corrugated side	DN500 20"	DN350 14"	DN350 14"	DN350 14"	DN350 14"	DN350 14"
Material plates	Standard: 1.4404 (316L), 1.4547 (254 SMO) On request: 1.4571 (316Ti) / 1.4301 (304) / 1.4539 (904L)					
Design temperature	According to PED 97/23 EC: -40°C to 350°C (-40°F to 662°F) According to ASME VIII: -28°C to 350°C (-18.4°F to 662°F)					
Design pressure	Up to 40 barg (580 psig) Including full vacuum					
Design code	PED 97/23 EC / EN 13445 (AD2000) ASME, VIII, Div. 1					
Flange ratings	Welded neck flanges EN 1092-1 / ANSI B16.5					
Nozzle loads	API 662 Table I API 662 Table II					

### Customisation Options:

- Plates in other alloys
- Fully welded vessel construction (not openable)
- Venting options
- Sub cooling
- Up to 1.800 m<sup>2</sup> (19,375 ft<sup>2</sup>) heat transfer area in one unit
- Higher design pressures available depending on application and design requirements
- Panel gasket material: Graphite as standard, PTFE on request





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