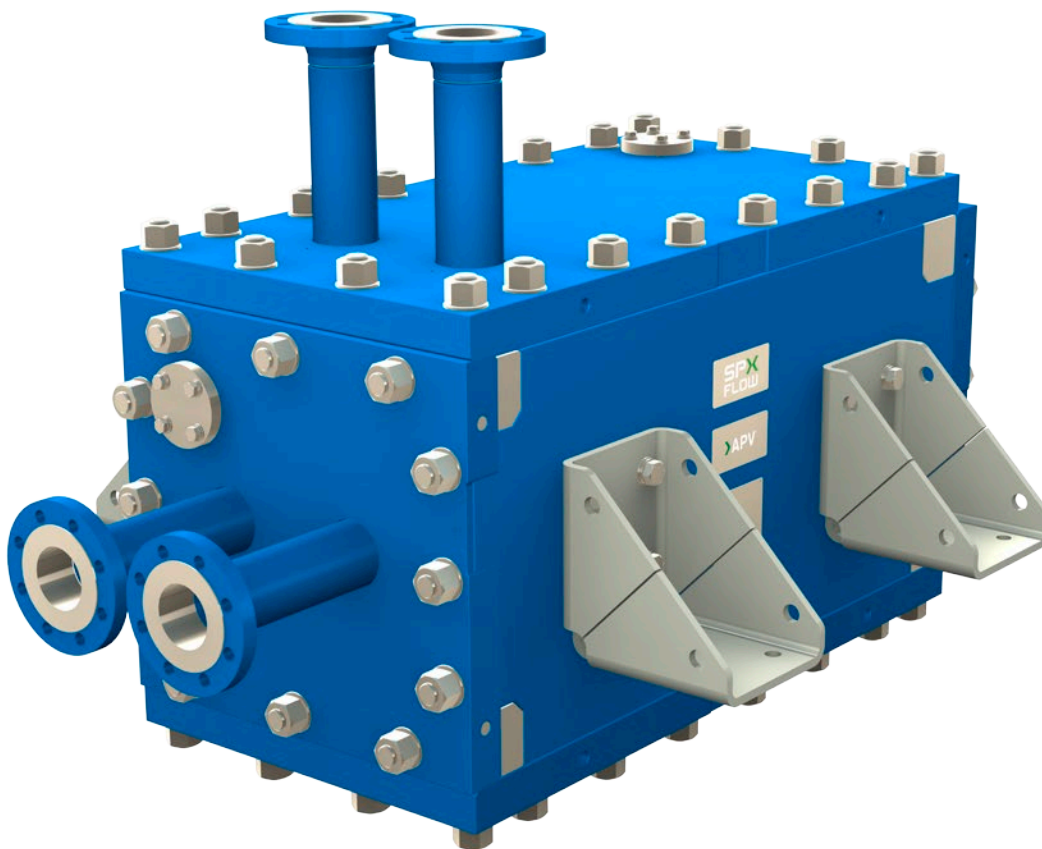


Hybrid - Welded Heat Exchanger

WITH MULTI-FLEXIBLE CONFIGURATION FOR ROBUST AND EFFICIENT HEAT TRANSFER



About APV

SPX FLOW 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 utilization 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 FLOW 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.

About SPX FLOW

Based in Charlotte, North Carolina, SPX FLOW is a leading global supplier of highly engineered flow components, process equipment and turn-key systems, along with the related aftermarket parts and services, into the food and beverage, power and energy and industrial end markets. SPX FLOW has more than \$2 billion in annual revenues and approximately 8,000 employees with operations in over 35 countries and sales in over 150 countries around the world. To learn more about SPX FLOW, please visit our website at www.spxflow.com

Choosing the Right Heat Exchanger can be a Complex Matter

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

- 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 FLOW knows the needs and priorities of most industries
- Let SPX FLOW guide you through complex choices to the right solution for your specific application and needs

IF THESE ARE SOME OF YOUR REQUIREMENTS ...

	What could happen if you compromise here?	What can you expect from APV and Hybrid?
Very High Working Temperature	Equipment failure/ replacement	Longer production uptime
Very High Working Pressure	Equipment failure/ replacement	Longer production uptime
Small Footprint	High conversion/ engineering costs	Cost savings, accessibility
High Heat Recovery, Extreme Small Log Mean Temperature Difference	Higher running costs	Cost savings, lower CO2 footprint
Cleanability, Manual & CIP	Reduced efficiency	Operation at desired specification after cleaning
Resistance to Corrosion	Equipment failure/ replacement	Long service life

THEN THE 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!

Typical Applications

The heart of the matter

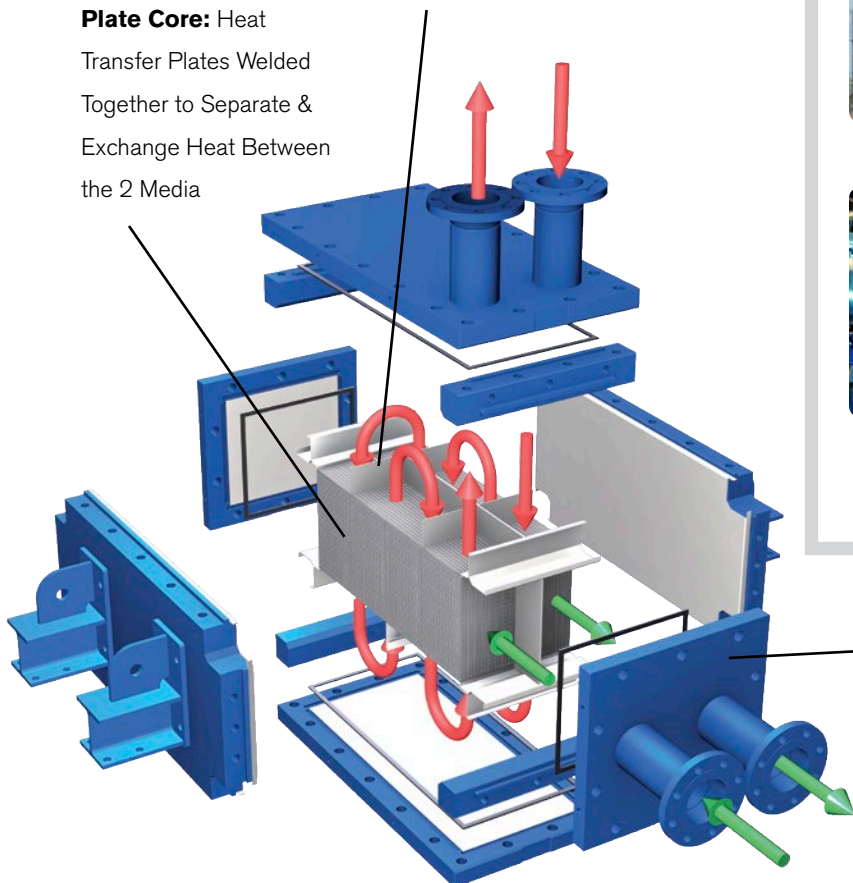
The central plate core is contained by 4 movable pressure panels, and the 2 flows are separated by the plate wall and 4 corner bars.

GENERAL USE

- ✓ Design temperature up to 662°F (350°C)
- ✓ Design pressure up to 580 psig (40 bar)
- ✓ Corrosive media
- ✓ Gas/steam/air with low pressure drop
- ✓ Pass-through of particles/solid

Pass Plates: Turn Flow To Support Multi-Pass Cross Flow

Plate Core: Heat Transfer Plates Welded Together to Separate & Exchange Heat Between the 2 Media



Oil & Gas

- Gas Sweetening
- Crude Oil Stabilizer
- Gas Dehydration
- Crude Oil Heater



Petrochemical & Chemical

- Solution Cooler & Heater
- Process Condenser
- Cryogenic Chiller



Power Generation

- Steam Condenser
- District Heating Units



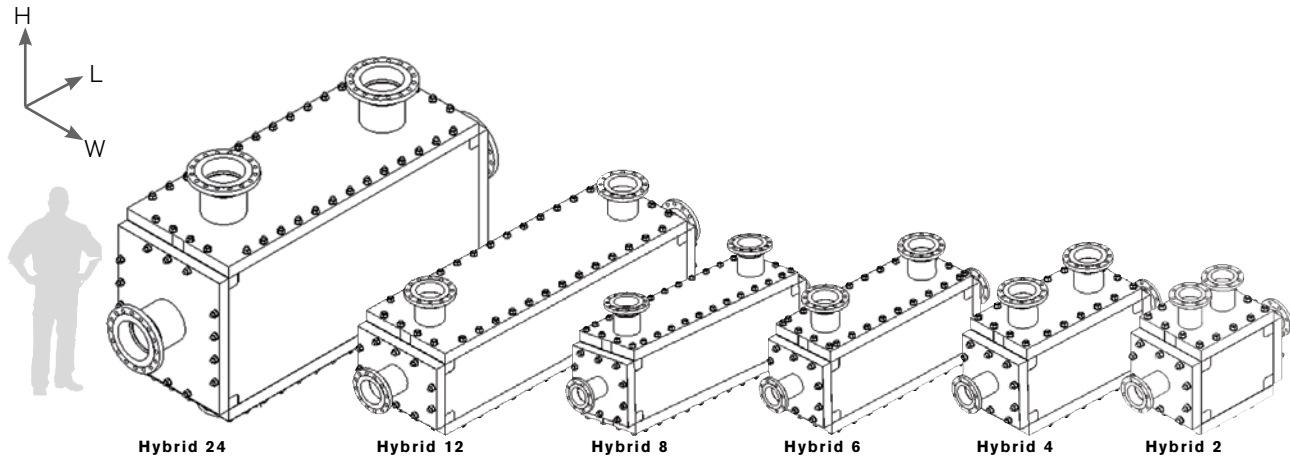
Industrial

- Reboiler

SPX FLOW provides advanced APV heat transfer solutions for additional applications

Panels: 6 bolted panels holding together the plate core

6 BASIC MODELS



Model	2	4	6	8	12	24
HEIGHT: IN (MM)	41 (1050)	41 (1050)	41 (1050)	41 (1050)	41 (1050)	57 (1450)
LENGTH: IN (MM)	45 - 56 (1150 - 1425)	62 - 73 (1580 - 1850)	79 - 90 (2010 - 2280)	96 - 107 (2440 - 2710)	130 - 141 (3300 - 3575)	130 - 141 (3300 - 3575)
WIDTH: IN (MM)	15 - 31 (390 - 785)	24 - 31 (610 - 785)	24 - 31 (610 - 785)	24 - 31 (610 - 785)	28 - 42 (715 - 1075)	28 - 42 (715 - 1075)

Inches (Millimeters)

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

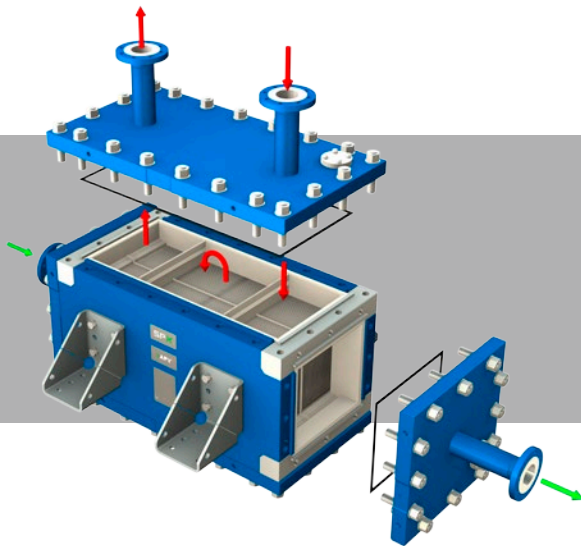
To meet all your needs

- Perfect adaptability for almost any application
- Full utilization of pressure drop to maximize thermal efficiency
- Close temperature approach down to 1.8°F (1°C) possible
- 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 utilization

Flexibility Based on a Range of Standard Variants

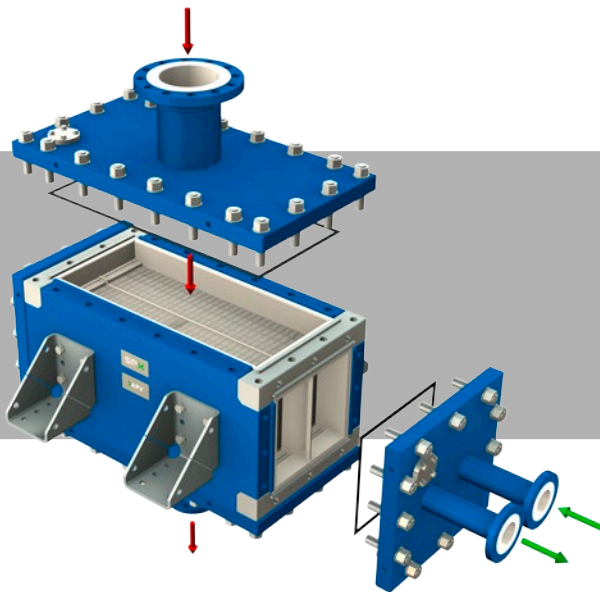
EACH AVAILABLE IN VARIOUS STANDARD CONFIGURATIONS:

EXAMPLE 1



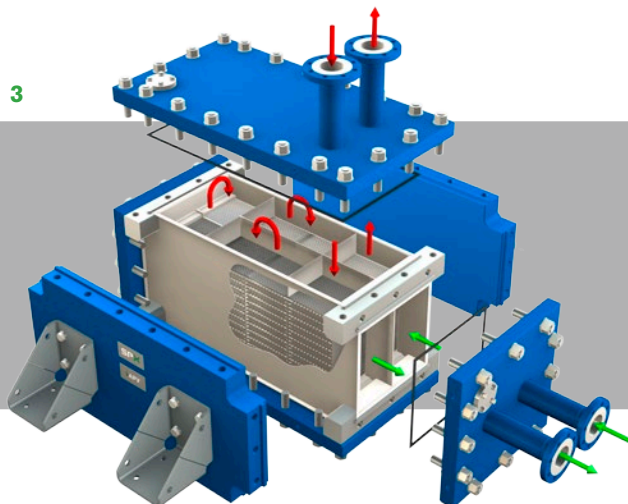
Low number of passes tube side system in combination with single pass corrugated side system for low NTU value applications and/or low pressure drop requirements

EXAMPLE 2



Single pass tube system in combination with corrugated side sandwich system for multiphase applications (e.g. condensation)

EXAMPLE 3

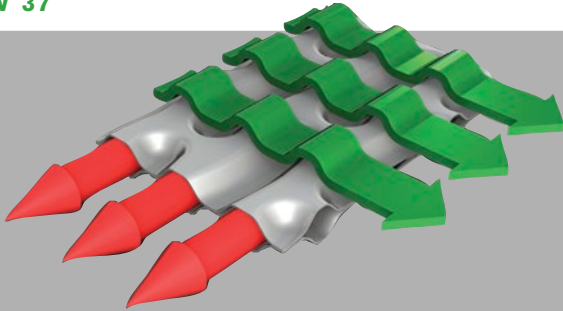


High number of passes tube side system in combination with corrugated side sandwich system for close temperature approach applications (e.g. heat recovery)

3 plate variants – depending on your needs

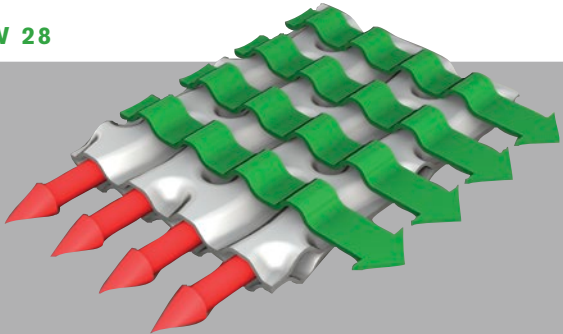
HYBRID FEATURES 3 VERY DIFFERENT PLATE TYPES!

TUPLAFLOW 37



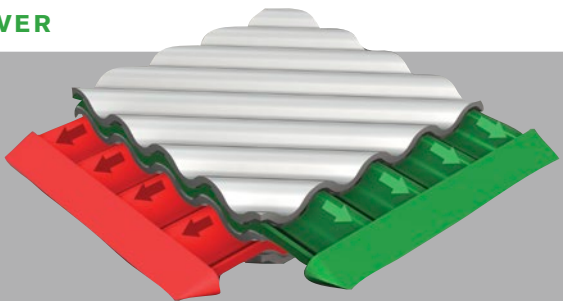
- If manual cleaning and/or low pressure drop are essential (e.g. steam/gas)
- Pressure drop on tube side can be kept extremely low
- Excellent for gas/steam
- Excellent mechanical cleanability combined with high heat transfer performance

TUPLAFLOW 28

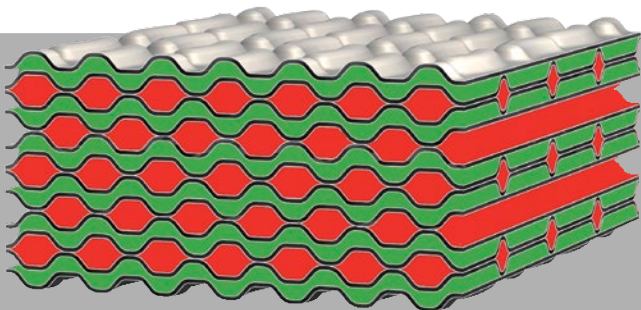


- If you want the best combination in between
- Good mechanical cleanability combined with excellent heat transfer performance

ENERGYSAVER



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



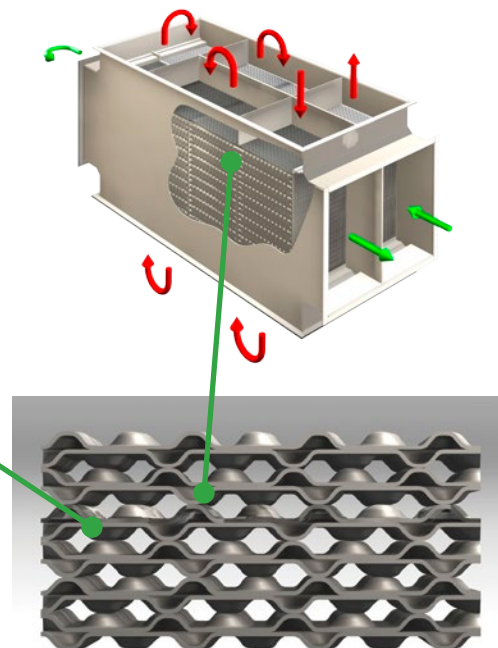
- Cross section of TuplaFlow plate types
- All plates are cross-flow

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



TuplaFlow plate pack



- Openable Design
- Bolted Hybrid can be Opened
- The Tube-Side Plate Gap can be High-Pressure Cleaned (TuplaFlow)

HUGE FLEXIBILITY BASED ON STANDARD VARIANTS

Model	2	4	6	8	12	24
HEAT TRANSFER IN FT² (M²)	54-280 (5-26)	237-549 (22-51)	366-829 (34-77)	484-1109 (45-103)	915-2498 (85-232)	1830-4995 (170-464)
MAX. NOZZLE SIZE TUBU SIDE	18" (DN450)	12" (DN300)	12" (DN300)	18" (DN450)	18" (DN450)	20" (DN500)
MAX. NOZZLE SIZE CORRUGATED SIDE	14" (DN350)	14" (DN350)	14" (DN350)	14" (DN350)	14" (DN350)	20" (DN500)
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°F to 662°F (-40°C to 350°C) According to ASME VIII I: -18.4°F to 662°F (-28°C to 350°C)					
DESIGN PRESSURE	Up to 40 barg (580 psig) Including Full Vacuum					
DESIGN CODE	PED 97/23 EC / EN 13445 (AD2000) ASME. VIII, D i v. 1					
FLANGE RATINGS	Welded Neck Flanges EN 1092-1 / ANSI B16.5					
NOZZLE LOADS	API 662 Table I API 662 Table II					

Inches (Millimeters)

Customization Options:

- Fully Welded Vessel Construction (does not open)
- Plates in Other Alloys
- Venting options
- Sub cooling
- Up to 1.800 m² (19,375 ft²) 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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