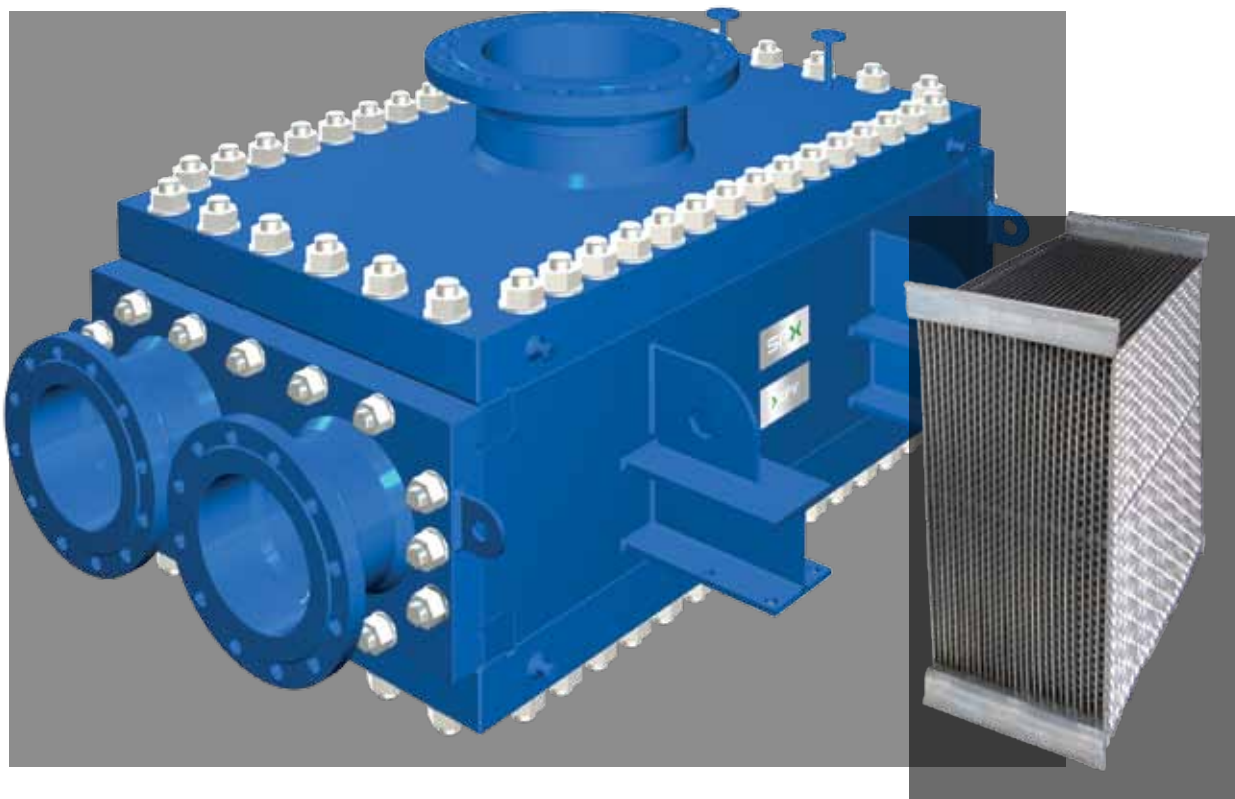


APV Hybrid - Welded Heat Exchanger

WITH MULTI-FLEXIBLE CONFIGURATION FOR ROBUST AND EFFICIENT HEAT TRANSFER



APV invented the plate heat exchanger in 1923 (Now SPX) and has continuously proven to be the preferred partner for heat transfer applications. By pioneering applicable technology in pressing, shaping, welding, sealing and testing steel, SPX has continued to develop and improve heat transfer technologies.

The company is committed to delivering an efficient and durable solution to ensure operational excellence, effectiveness and profitability.

SPX offers an extensive portfolio of plate heat exchanges covering many industrial applications. Regularly SPX heat exchangers replace older technology products due to the simplicity of installation and their high performance thermal characteristics. Whether recovering waste heat or isolating the cooling system from the cooling source, SPX has the application knowledge and product to improve efficiency and performance.

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?
Very high working temperature, (including temperature shocks)	Equipment failure/ replacement	Longer production uptime
Very high working pressure (including pressure shocks)	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 and CIP	Reduced efficiency	Operation at desired specification after cleaning
Resistance to corrosion	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

- ✓ 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

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



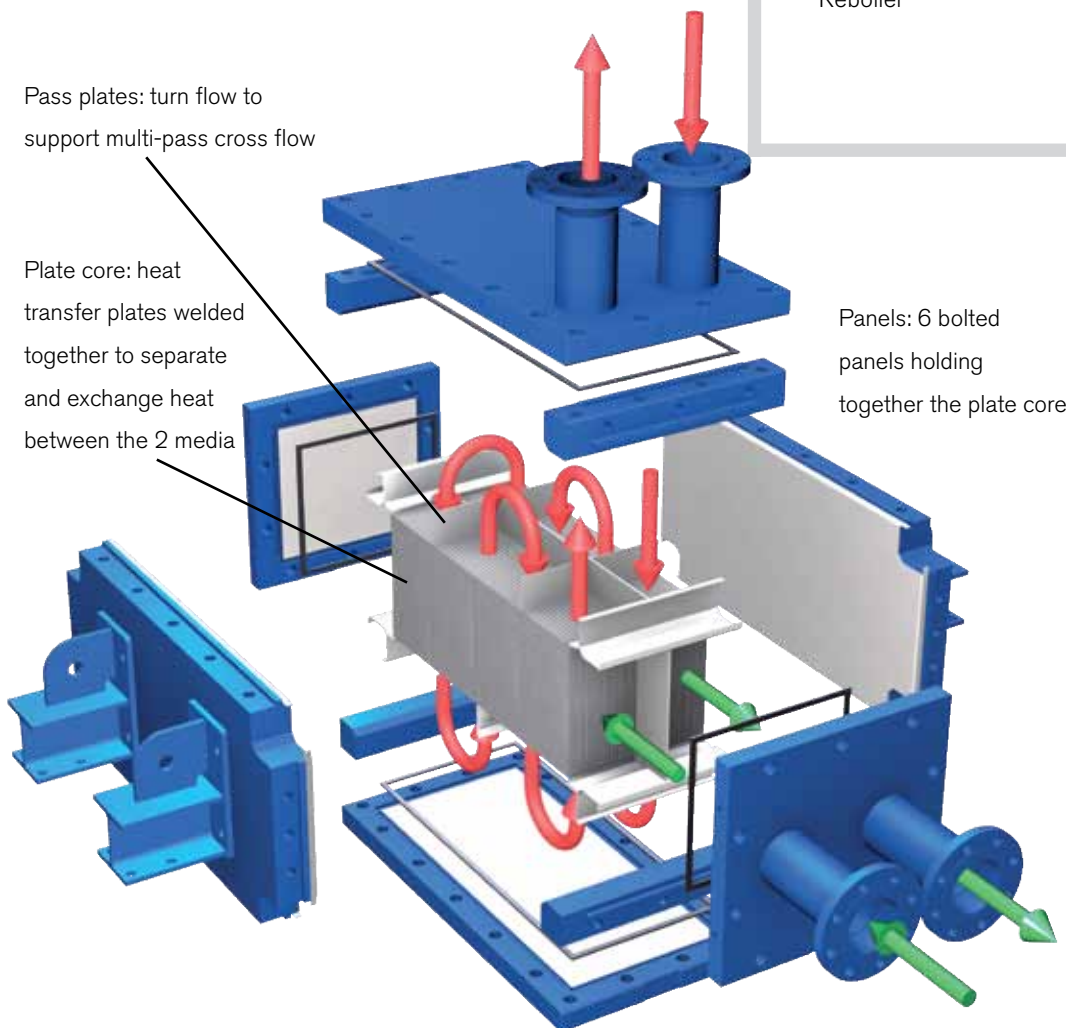
Power

- Steam condenser
- District heating units

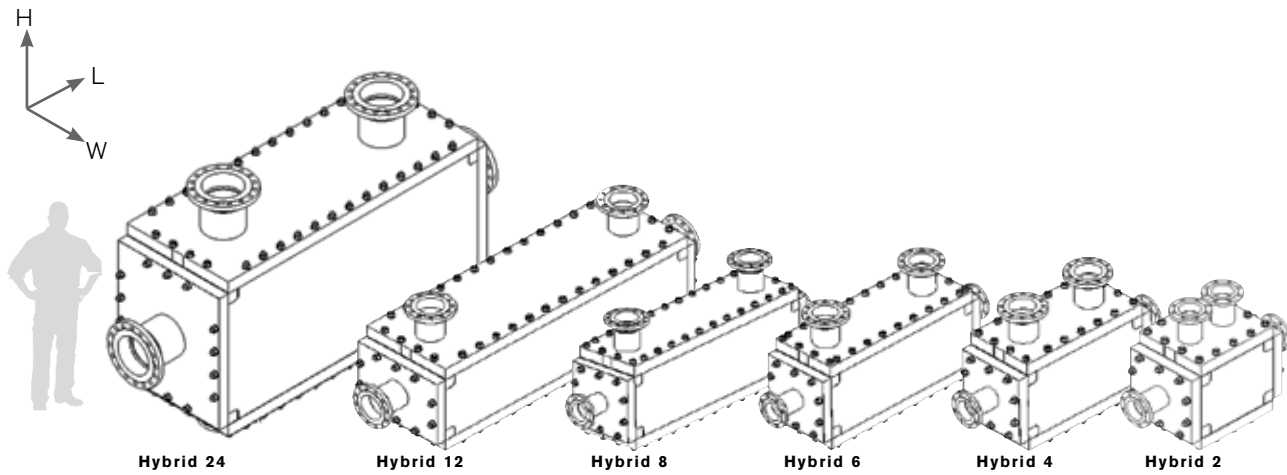


Industrial

- Reboiler



6 BASIC MODELS



Model	2	4	6	8	12	24
Height	41.42 (1052)	41.42 (1052)	41.42 (1052)	41.42 (1052)	41.42 (1052)	58.43 (1484)
Length	56.10 (1425)	73.11 (1857)	90.12 (2289)	107.13 (2721)	141.18 (3585)	141.18 (3585)
Width	15.4-31.98 (391-787)	23.90 (607)	23.90 (607)	23.90-31.98 (607-787)	28.15-42.32 (715-1075)	28.15-42.32 (715-1075)

Inches
(Millimeters)

... 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 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

456 STANDARD COMBINATIONS PER PLATE MATERIAL:

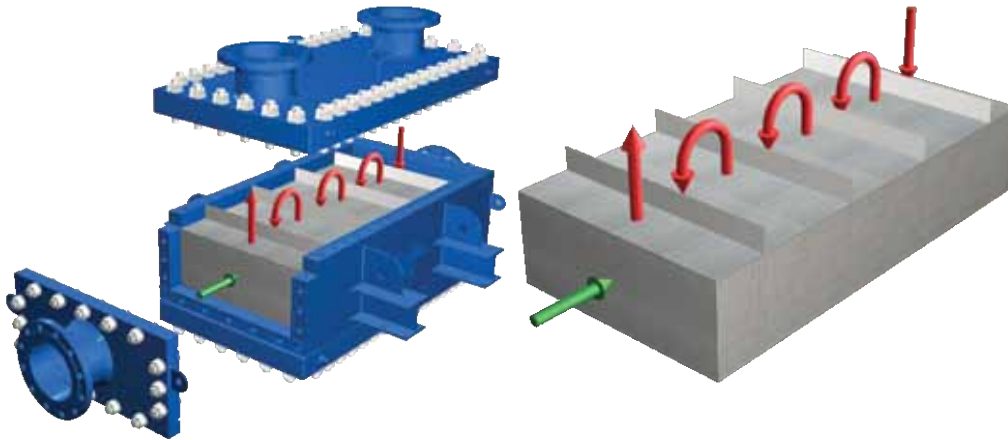
Model	2	4	6	8	12	24
Number of thermal steps	2	4	6	8	12	2x12
Stack height versions	5	1	1	3	5	5
Possible pass combinations on primary side (corrugated side)	3	3	3	3	3	3
Possible pass combinations on secondary side (tubular side)	4	5	7	6	9	9

- Design Pressure: 232.1 or 464.1 psig (16 or 32 Bar)
- Design Code: ASME VIII, Div 1 or PED
- Design Temperature: -18.4/-40 to 662°F (-28/-40 to 350°C)

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

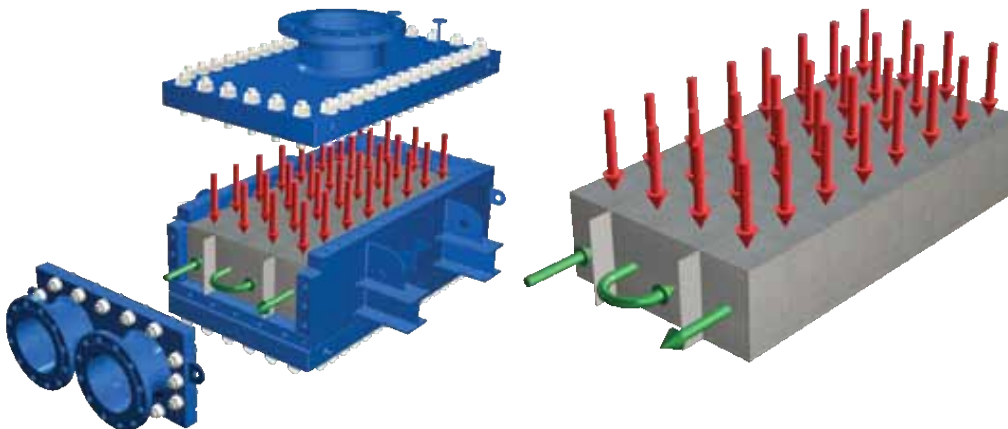
EACH AVAILABLE IN VARIOUS STANDARD CONFIGURATIONS:

EXAMPLE 1



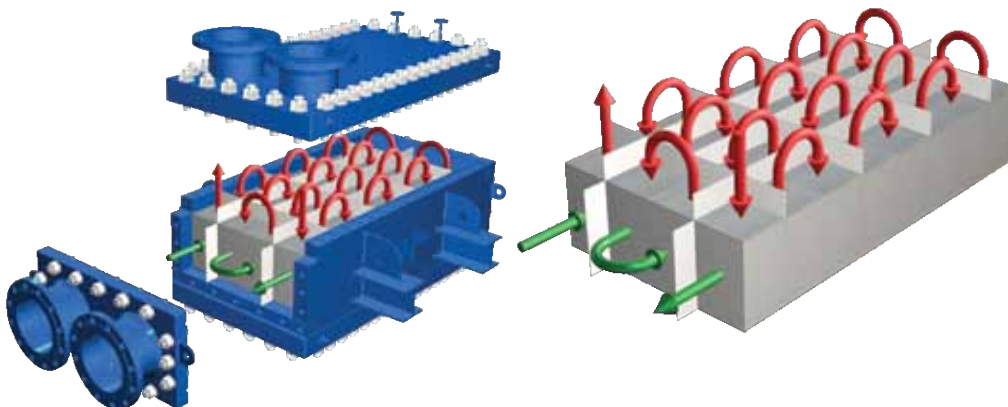
Low number of passes tube side system in combination with single pass corrugated side system for low NTU value applications and/or low pressure drop requirements

EXAMPLE 2



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

EXAMPLE 3

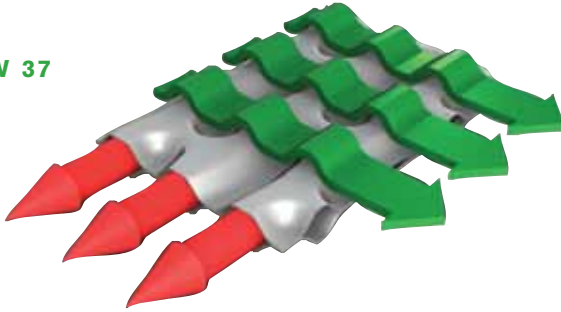


High number of passes tube side system in combination with corrugated side sandwich system for close temperature approach applications (heat recovery)

3 plate variants – depending on your needs

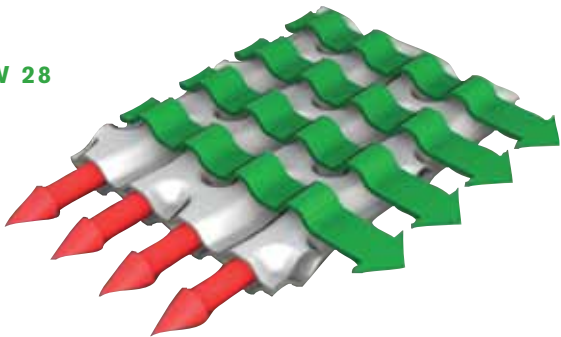
HYBRID FEATURES 3 VERY DIFFERENT PLATE TYPES!

TUPLAFLOW 37



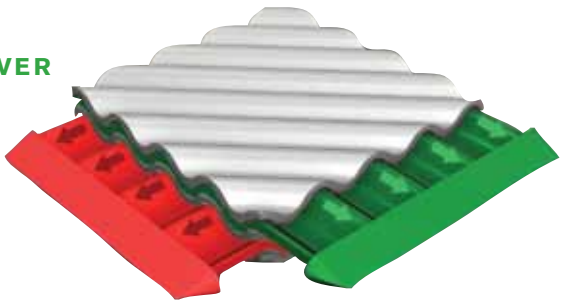
- If manual cleaning and/or low pressure drop are essential (e.g. steam/gas).
- Pressure drop on tube side can be kept extremely low
- Excellent for gas/steam
- Excellent mechanical cleanability combined with high heat transfer performance

TUPLAFLOW 28

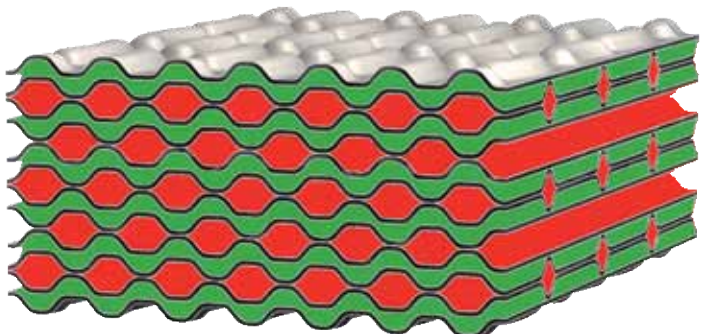


- If you want the best combination in between.
- Good mechanical cleanability combined with excellent heat transfer performance

ENERGYSAVER



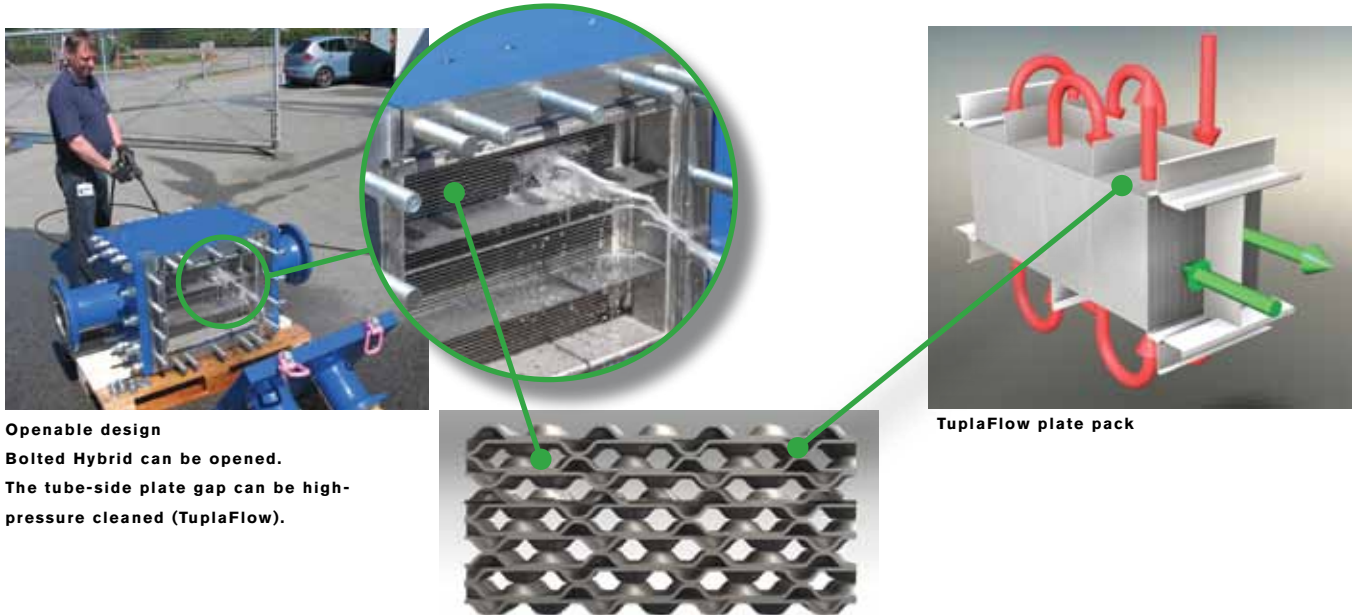
- If your focus is optimum efficiency and pressure drop limitations are not an issue.
- High turbulence
- Highest efficiency
- Highest pressure resistance



- 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.



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	2	4	6	8	12	24
Heat transfer	65-269 ft² (6-25 m ²)	301-355 ft² (28-33 m ²)	441-538 ft² (41-50 m ²)	592-1044 ft² (55-97 m ²)	1130-2346 ft² (105-218 m ²)	2260-4693 ft² (210-436 m ²)
Max. nozzle size Tubu side	18" (DN450)	14" (DN350)	14" (DN350)	20" (DN500)	20" (DN500)	20" (DN500)
Max. nozzle size Corrugated side	12" (DN300)	12" (DN300)	12" (DN300)	12" (DN300)	12" (DN300)	20" (DN500)
Material plates	Standard: 1.4404 (316L) On request: 1.4571 (316Ti) / 1.4301 (304) / 1.4539 (904L) / 1.4547 (254SMO) / 2.4819(276) / 2.4602(C22) / 2.4605(C2000) / and others					
Design temperature	According to ASME VIII: -18.4°F to 662°F (-28°C to 350°C) According to PED 97/23 EK: -40°F to 662°F (-40°C to 350°C)					
Design pressure	16 and 32 bar versions, including full vacuum.					
Design code	PED 97/23 EG / EN 13445 ASME. VIII, Div. 1					
Flange ratings	Welded neck flanges EN 1092-1 / ANSI B16.5					
Nozzle loads	API 662 Table II					

Inches
 (Millimeters)

Customization Options:

- Plates in other alloys
- Fully welded vessel construction (not openable)
- Venting options
- Sub cooling
- >53819 ft² (5000 m²) heat transfer area



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TRANSFER



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