

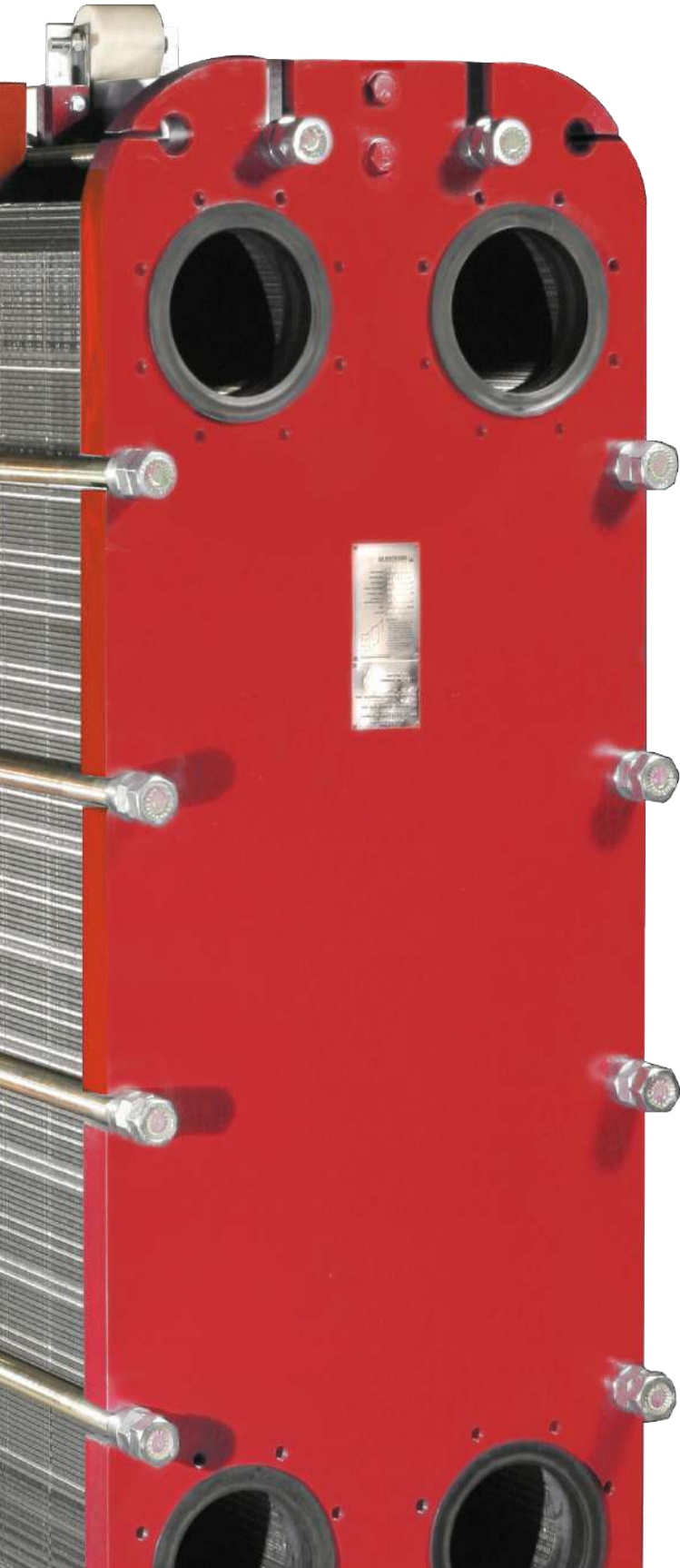


Plate Heat Exchangers

SOLUTION OUTLINE

FILE NO: 113.12
DATE: MAY 2024

SUPERSEDES: 113.12
DATE: JANUARY 2024

EFFICIENT HEAT TRANSFER IN A COMPACT DESIGN

Armstrong's gasketed Plate Heat Exchanger (PFX) product line includes a the large global selection of models and offers the most configurations, connections and material options, providing a superior heat transfer solution for any HVAC application.



MARKET CHALLENGES

Rising demand for tenant space in commercial buildings and an ever-increasing focus on reducing energy consumption have created numerous challenges for designers and contractors. These challenges include the requirement for mechanical room optimization and energy recovery or free cooling systems such as water-side economizers, geothermal heating/cooling and deep-lake water cooling. There is now, more than ever, a growing demand for compact heat exchangers capable of transferring heat at low approach temperatures to achieve greater temperature crossing, which saves energy.

In addition, factors such as global warming, high frequency of building conversions, and smaller mechanical rooms have led to a demand for heat exchangers that can be maintained easily and are flexible with regards to future expansion.

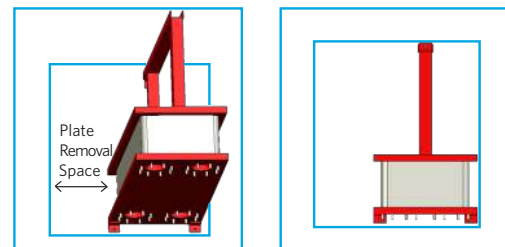
ADDING VALUE TO HYDRONIC SYSTEMS

SPACE SAVINGS

Due to their high heat transfer capabilities, Armstrong PFX series heat exchangers are substantially smaller in size than other heat transfer devices, yet provide the same or better performance. Plate heat exchangers save up to 75% of the floor area, and up to 85% of the floor length required for shell and tube heat exchangers (including area to service the heat exchanger).

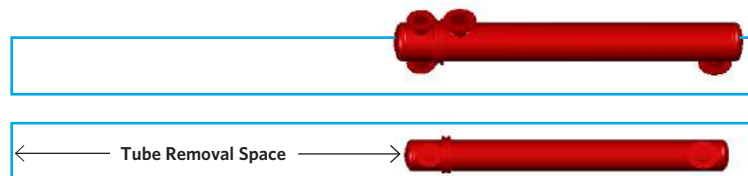
Plate heat exchanger footprint

Space required in feet (metres) = 5.3 (1.60) × 4.7 (1.43) = 24.9 ft² (2.29m²)
Based on Model S106-1250



Shell & Tube heat exchanger footprint

Space required in feet (metres) = 2.5 (0.76) × 32.3 (9.85) = 80.8 ft² (7.5 m²)
Based on Model W2214



PROJECT RISK MINIMIZATION

All units are certified for safety by the appropriate agency (i.e. ASME, PED, AHRI, etc). Heat transfer plates can be added, replaced or removed easily to maintain or increase the system performance. Gaskets are vented between passages, so there is no cross contamination from a gasket failure. Every unit is provided with a safety shield that surrounds the plates and gaskets. Double-wall heat transfer plates are available for domestic water applications. Select models are available with a design pressure up to 435 psi (30 bar).

MAINTENANCE

Single-pass PFX units are designed with all four system connections on the fixed head. This ensures the unit can be easily maintained without having to break the connecting piping. In addition, plate heat exchangers can be installed in a corner of a mechanical room to optimize the space. When maintenance is required, gaskets are easy to replace and plates can be removed and installed from one side of the unit.

INSTALLATION ADVANTAGE

Armstrong's plates are designed to be taller and wider than our competition. This reduces the required floorspace in the mechanical room.

Connections are typically on the same plane for easy piping. Studded flanged connections reduce piping loads on the plate heat exchanger. Units can be certified at the factory and then shipped disassembled for delivery and installation in tight quarters. The vertical piping arrangement (inlet on top and outlet on bottom) of PFX series units makes them ideal for condensing steam service.

OCCUPANT COMFORT

Armstrong PFX series heat exchangers react quickly to system demand changes, and provide reduced down-time and longer life span due to corrosion resistant materials, anti-scaling effect (due to turbulent flow) and ease of maintenance.

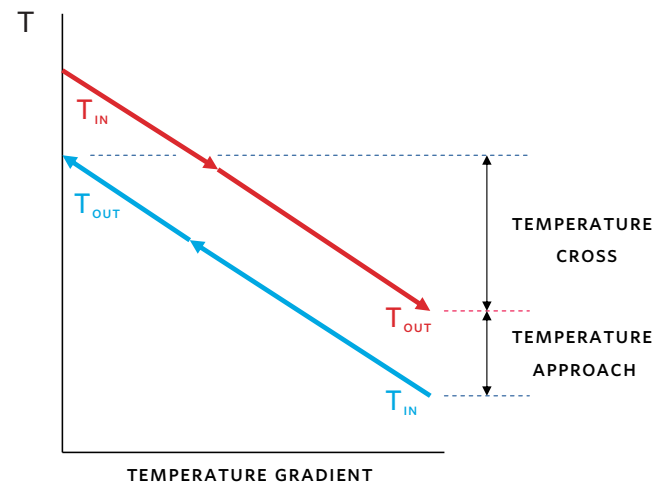
ENERGY EFFICIENCY

The Armstrong PFX series achieves the highest efficiency and heat transfer rates by flowing the two media in opposite directions (counter-current) in a highly turbulent fashion. The temperature gain or loss between the hot fluid and the cold fluid at a given flow rate is the regeneration rate. With counter-current flows, high turbulence and optimized corrugation, Armstrong PFX series units provide regeneration rates of up to 90%.

$$\% \text{ Regeneration} = (T_{\text{in [hot fluid]}} - T_{\text{out [hot fluid]}}) / (T_{\text{in [hot fluid]}} - T_{\text{in [cold fluid]}}) \times 100$$

Armstrong PFX series heat exchangers offer multiple plate geometries to provide the optimum heat transfer solution for a given application.

COUNTER CURRENT FLOW & TEMPERATURE



TECHNICAL DATA

FLOW RANGE		Up to 32,000 gpm (2000 L/s)
DUTY		Up to 57,000,000 btu/hr (16,700 kW)
MAX. FLUID TEMPERATURE	NITRILE GASKETS	284°F (140°C)
	EPDM GASKETS	302°F (150°C) for standard applications 356°F (180°C) for steam applications
MAX. WORKING PRESSURE		435 psi (2999 kPa, 30 bar)

MATERIALS OF CONSTRUCTION

PLATES	304 and 316 stainless steel, titanium
GASKETS	Nitrile, EPDM, Viton

Other materials are available on request.

CERTIFICATIONS

Safety: ASME, PED, CRN, NSF 61

Performance: AHRI



HOW IT WORKS

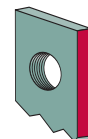
The Armstrong PFX series uses robust stainless steel and titanium plates (standard construction) as the primary medium for heat transfer. Each plate is stamped with an optimized corrugated design. The series of plates create alternating independent channels for both the process and service fluids. The two medium circuits are configured to induce true counter-current flow, enabling the heat exchanger to perform at extremely low temperature approaches. This is further improved by using Armstrong plates. As each fluid passes through its individual channel, it flows over the 'chevrons' (the corrugated pattern), which increases fluid turbulence, and increases heat transfer through the plates. Heat is transferred from one medium to the other. The Armstrong PFX series uses a gasketed seal to separate the service side from the process side.



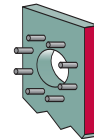
DESIGN FEATURES

- ① All connections are threaded or studded to the cover in order to eliminate nozzle loads caused by the piping.
- ② Gaskets are double-vented at the port area to eliminate cross contamination of the fluids. Gaskets are attached mechanically to the plate. They attach to the plate only one way, eliminating assembly errors and wasted time during servicing. The gaskets are visible from outside the unit so proper installation is guaranteed.
- ③ Models with ARMLock gaskets are self locating and locate plates together, minimizing service time. Also, models with ARMLock gaskets minimize exposure to the air, increasing gasket life.
- ④ Tightening bolts are designed so that all tightening is done from the fixed end (nuts at the moveable end are locked). Bolts are coated for corrosion resistance. This makes servicing the heat exchanger quicker and easier.
- ⑤ The bars that hold the plates are corrosion resistant for ease of maintenance.
- ⑥ Heavy duty pressure-retaining headers are designed using the latest stress calculation data, as per ASME and PED, to ensure lengthy and safe service.
- ⑦ Heat transfer plates are stamped using multiple plate patterns and selected according to the application requirements.
- ⑧ Armstrong's plates are designed to be taller and wider than our competition. This increases the effective heat transfer area per plate compared to the traditional design and also reduces the floorspace required in the mechanical room.
- ⑨ An galvanized safety shield covers the top and sides of the plate pack.

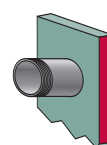
STANDARD CONNECTION TYPES



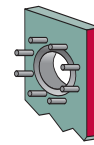
**THREADED
INTERNAL**



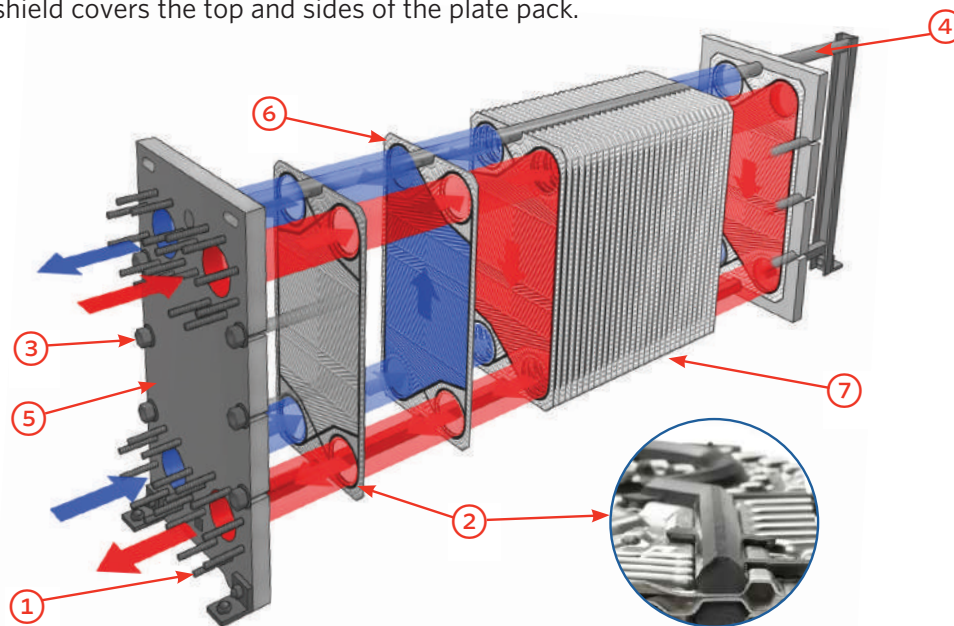
STUDED



**THREADED
EXTERNAL
ALLOY**



**STUDED
ALLOY LINER**



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