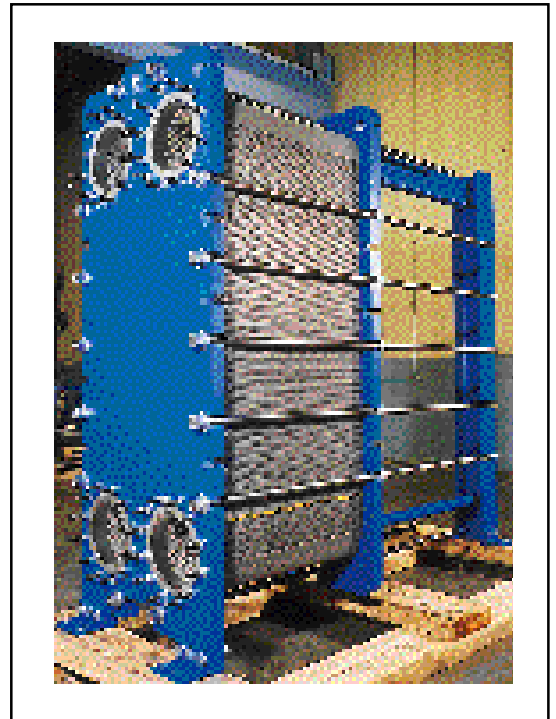
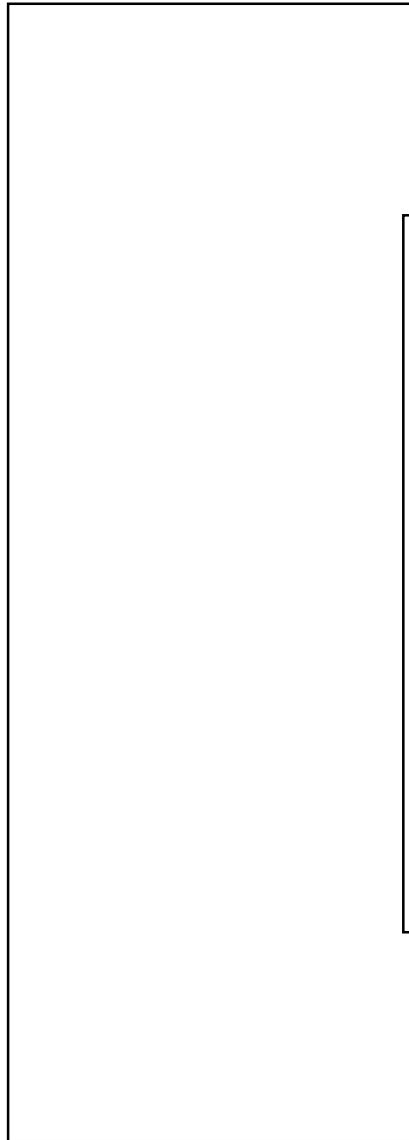


Refrigeration Welded Pair Plate Heat Exchangers



WP Series

FES has a long history of applying state-of-the-art equipment technology to the industrial refrigeration industry.

WP Series (welded pair) plate heat exchangers are our latest product innovation.

Benefits and features include:

- easy maintenance
- energy efficient
- economical
- availability to easily increase heat transfer area
- advanced technological design
- smaller footprint than comparable duty shell and tube heat exchangers.

Refrigeration applications include:

Flooded Evaporator

Direct Expansion Evaporator

Condensers

Desuperheaters

Subcoolers

Oil Coolers

WP Series

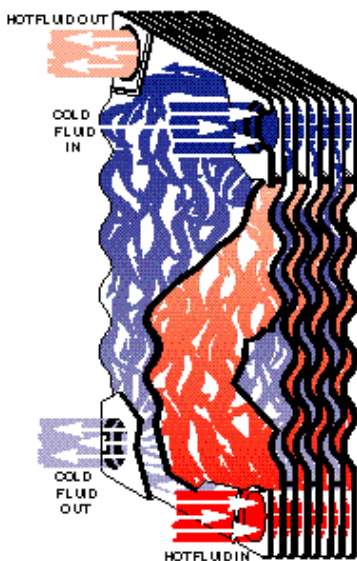
FES WP Series plate heat exchangers consist of thin metal plates suspended from a top carrying bar, aligned by a lower guide bar, and compressed by means of tie bars between a stationary head and a movable follower. Each plate has corner ports to permit passage of fluids and is fitted with a gasket to provide a peripheral seal while directing fluids into alternate channels. All fluid connections are located on the fixed head so that the unit may be opened for cleaning or inspection without disturbing the piping.



The key to WP Series efficiency and economy of operation lies in the heat transfer plates—the unique, patented corrugation patterns that induce turbulent flow and possess inherent mechanical strength. All WP Series plates are manufactured in pairs, using a laser welding process to produce a double bead of weld as added security against leakage.

Since plate geometry is a vital factor in thermal efficiency, WP Series plates are designed with deep, closely spaced corrugations that promote liquid turbulence across the entire heat transfer surface. This results in the highest possible heat transfer coefficients at relatively low pressure drop and allows for closer temperature approaches. Fluid entrance and exit areas are designed to minimize pressure drop and provide uniform flow distribution across plate surfaces.

Plates are pressed for either diagonal or vertical flow, depending on the model. Standard plates are 0.5 or 0.6mm thick made from 316 stainless steel. Other thicknesses and materials of construction may be specially selected based on the chemical fluids and



Cutaway shows turbulence during passage of refrigerant and cooling water or process fluid.

hanging eye to facilitate installation and maintain proper plate alignment and support within the frame. Mechanical strength is further enhanced by means of interplate support. Some models utilize pips, pressed into the plates with deep washboard corrugations providing contact points every 1 to 3 square inches of heat transfer surface. Other models accomplish strengthening via chevron plates alternately arranged such that corrugations cross, maintaining a peak-to-peak contact point for every 0.2 to 1 square inch of area.

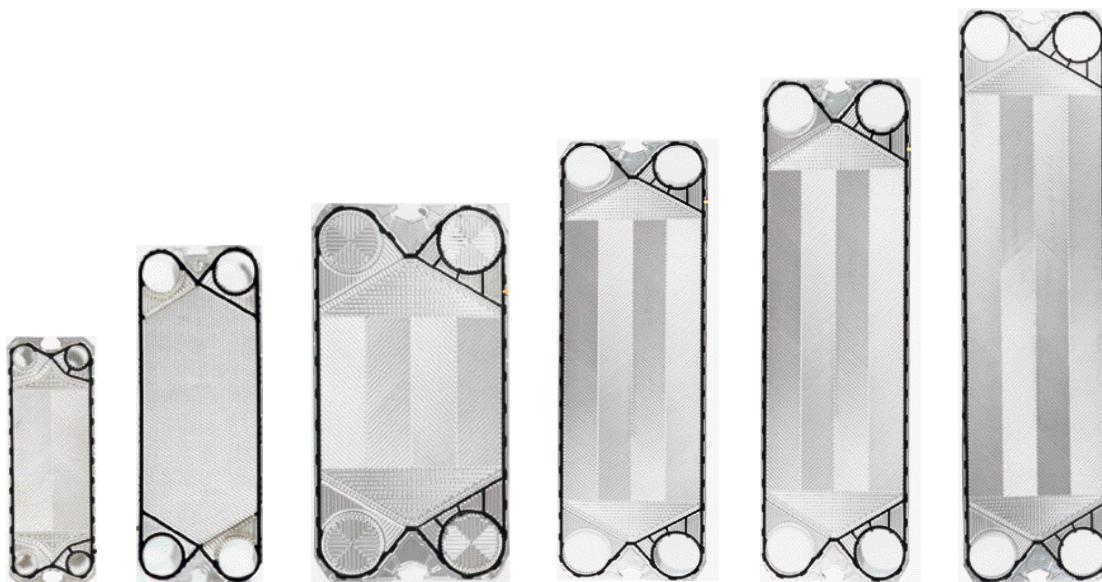
Mixing angles and plate length can be varied within each model to maximize a selection with the minimum number of plates while meeting thermal performance, pressure drop, and other heat exchanger and refrigeration system design criteria.

All WP Series plates are designed to handle the specified duty using a single pass flow arrangement, simplifying piping and maintenance by having all connections on the stationary head of the heat exchanger. When plates are added in the field to change unit capacity, as well as during unit cleaning, the single pass arrangement permits these operations without disturbing the system piping.

Gaskets

Molded to fit with precision into a specially designed groove in the plate, gaskets not only provide a peripheral seal between plates but also separate product flow areas from thru ports. The space between double gasketing around port areas is vented to the atmosphere to prevent cross-contamination between fluids.

Interlocking gaskets have raised lugs and scallops sited intermittently around the outside edges. The scallops ensure that there are no unsupported portions of the gaskets and, in combination with the gasket



groove, provide mechanical plate-to-plate support of the sealing system.

The raised lugs help maintain plate alignment during plate pack closure and operation. The gasket groove is designed to give 100% peripheral support, preventing gasket movement, assuring uniform compression of the gasket, and minimizing exposure of the elastomer to process liquid or service media.

Standard neoprene gaskets provide chemical and temperature resistance, excellent sealing properties, and long-term performance. Gaskets are held in place in the gasket grooves with either clips or cement, depending on the model. Other gasket materials are available for special applications.

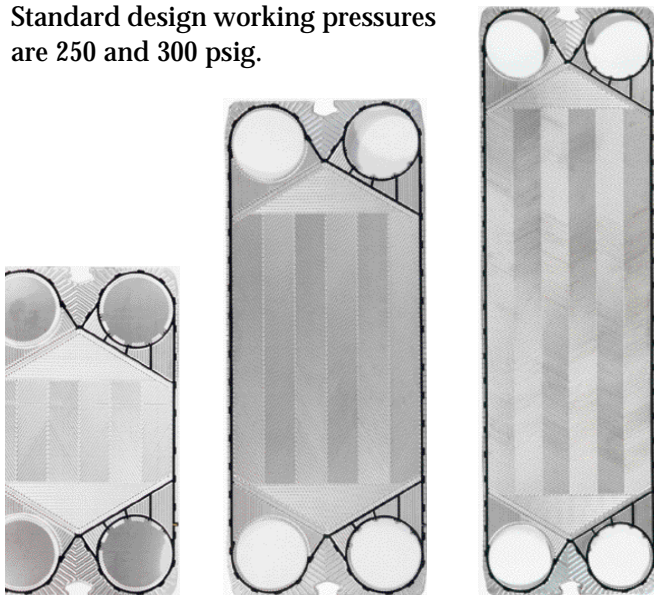
Frames

WP Series frames consist of a carbon steel stationary head which is joined to an end support by means of top and bottom horizontal bars, bolted together via removable heavy duty tie bars. Individual plates are hung from a carrying strip attached to the top of the frame, and are aligned by a bottom guide bar. Plates are compressed between the stationary head and a follower which moves on ball bearing supported rollers.

Tie bars of high tensile strength are used to compress the plate pack, with tightening done from the head to avoid damage to exposed tie bar threads. Captive nuts and thrust washers are used to lock the tie bars into keyhole slots in the head and follower.

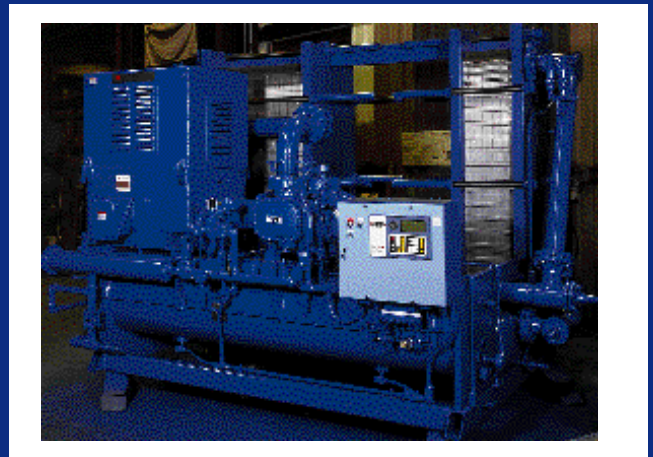
After sandblasting, frames are finish painted. Various stainless steel trim packages are available for all models.

Frames are designed, manufactured, and tested to ASME Section VIII, Division I code. Standard design working pressures are 250 and 300 psig.



Packaged Units

In addition to stand-alone heat exchangers, FES incorporates the WP Series into various factory-mounted packages, including R-717 DX water chillers from 200-600 tons, flooded evaporators with surge drum and associated piping, and complete packaged refrigeration systems.





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**WP Series Plate Heat Exchanger
Engineering Data Sheet**

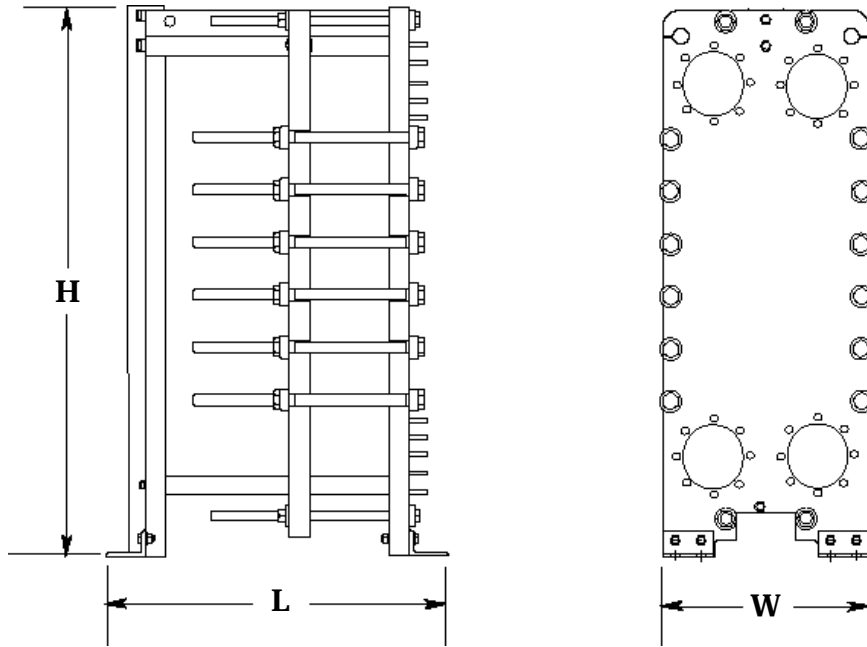
End User:	Date:
Project Name:	By:
Quote No.:	

1. Model:
2. Application:

DUTY PER UNIT	HOT SIDE	COLD SIDE
3. Fluid:		
4. Total Fluid Flow Rate: lb/hr		
5. Inlet Vapor: lb/hr		
6. Inlet Liquid: lb/hr		
7. Non-Condensables: lb/hr		
8. Fluid Vaporized: lb/hr		
9. Fluid Condensed: lb/hr		
10. Temperature In: F		
11. Temperature Out: F		
12. Specific Gravity:		
13. Specific Heat: BTU/lb*F		
14. Thermal Conductivity: BTU/ft*hr*F		
15. Viscosity In: cPs		
16. Viscosity Out: cPs		
17. Latent Heat: BTU/lb		
18. Pressure Drop Allowed: psi		
19. Passes:		
20. No. of Plates:		
21. Calculated Pressure Drop: psi		
22. Inlet Connection Location:		
23. Outlet Connection Location:		
24. Design Pressure: psig		
25. Design Temperature: F		
26. Heat Transfer Area (ft ²):	No. of Plates:	
27. Heat Load (BTU/hr):	LMTD (F):	
28. Overall Coeff. (BTU/ft ² *hr*F) Clean:	Corr. LMTD (F):	
29. Overall Coeff. (BTU/ft ² *hr*F) Design:	Fouling:	

MECHANICAL DATA FOR ONE UNIT	
30. Plate Model:	Plate Length:
31. Frame Size:	Mixing Angle:
32. Dry Weight (lb):	Flooded Weight (lb):
33. Frame Material:	
34. Plate Material:	
35. Gasket Material:	
36. Hot Connection In:	
37. Hot Connection Out:	
38. Cold Connection In:	
39. Cold Connection Out:	

Physical Data



WP Series Physical Data

FES Model Number	Max. GPM	Surface Area/Plate (sq. ft.)	Height (H)	Width (W)	Max. Length (L)	Max. Dry Weight (lbs.)	Conn. Size
2WP-A	250	1.87	41 7/16"	15 3/8"	66 23/32"	1,609	2"
4WP-A	800	4.06	59 1/4"	22 9/16"	80 13/16"	3,537	4"
8WP-A	3100	5.77	68 1/4"	32 3/16"	125 13/16"	9,211	8"
8WP-B	3100	9.10	85 1/4"	32 3/16"	125 13/16"	12,458	8"
8WP-C	3100	12.50	102 1/4"	32 3/16"	125 13/16"	15,153	8"
8WP-D	3100	15.75	119 1/4"	32 3/16"	125 13/16"	18,275	8"
12WP-A	7000	6.78	80 11/16"	40 3/4"	211 3/8"	17,984	12"
12WP-B	7000	11.84	99 5/8"	40 3/4"	211 3/8"	22,974	12"
12WP-C	7000	14.42	108 9/16"	40 3/4"	211 3/8"	25,491	12"
12WP-D	7000	17.01	118 5/8"	40 3/4"	211 3/8"	28,881	12"
12WP-E	7000	22.07	137 1/2"	40 3/4"	211 3/8"	34,013	12"



A company of mg technologies group

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