# Plate Heat Exchangers

1. All PHEs must be certified to AHRI Standard 400 for Liquid-to-Liquid Heat Exchangers. Each PHE selection must carry the AHRI 400 Certification Stamp as shown in the figure. In addition to the AHRI Standard 400 compliance, the PHEs should comply with the Pressure Equipment Directive (PED) 2014/68/EU or ASME Sec VIII Div I.

AHRI 400 Certification Stamp for PHE

##  PART 1 – Specification

1. Design
2. Designed for CHW cooling applications
3. Counter current flow type
4. Performance Requirements
5. Units shall be sized to meet design conditions as specified in the schedule with a maximum allowable pressure drop as per schedule.
6. Units shall be sized with allowance for 20% additional space for future addition of plates
7. Working Pressure / Temperature – minimum 16 bar / 35 °C or as per schedule.
8. Units shall be **AHRI certified**
9. The units shall withstand the maximum test pressure on either hot or cold side with the opposite side at 0 bar or as per schedule
10. Metal nameplate to be provided on each of the supplied PHEs with the following details:
	1. Manufacturer’s name
	2. Type of Unit
	3. Serial No.
	4. Year of manufacture
	5. Fluid group
	6. Inlet / Outlet connections
	7. Volume
	8. Design Pressure
	9. Design Temperature
	10. Test Pressure with Date
11. Materials
12. Materials and equipment used shall be compatible with the climatic and environmental conditions of installation location.
13. Plates
	1. One-piece pressed type AISI 316 stainless steel plate, with 2B finish and tapered gasket grove
	2. The plates shall not have holes for sealing of gasket
14. Each plate to have herringbone corrugations to optimize heat transfer with nominal pressure losses
15. The pressing depth shall not exceed 2.5 mm.
16. Minimum plate thickness 0.5 mm for pressure rating up to 16 bar
17. End plates shall be of AISI 316 material and 0.6mm thickness
	1. Design of plates shall strictly follow counter current flow principle
	2. Design to allow for removal and replacement of single plate without removal of the plate on either side
	3. Design shall prevent fluid intermixing and provide leakage to the outside of the unit
	4. Plates should not lock to adjacent plates
18. Plates and gaskets shall be permanently marked to identify quality and material type
19. Each plate should strictly have a built in five-point alignment system to accurately locate the plates in the frame assembly to prevent lateral plate movement maintain maximum gasket contact under pressure
	1. The frame plates shall shave no welded stiffeners etc. and should be designed to allow pressurization of each circuit to a full differential of 1.3 times the design pressure without buckling or deformation of heat transfer plates
20. Gasket
21. One-piece, moulded Nitrile Butyl Rubber (NBR) gasket
	1. Gaskets shall have relieving grooves to prevent intermixing of fluids and cause leak to outside of unit
	2. The gaskets shall be locked into the groove by Clip-on method. Glued gaskets are not acceptable
	3. The gaskets should not be used for locking of the plates before tightening
22. Frame
23. The frame assembly should be bolted construction and not welded frame assembly
24. The frame shall be carbon steel construction coated with two-part blue paint. Manufacturer painting specifications to be provided.
	1. The moveable cover shall have only stainless-steel material roller for ease of movement without additional rigging or handling equipment
25. Provide lifting lugs to allow lifting of entire unit’s flooded weight
26. Bolts shall be provided with rolled threads to reduce galling and minimum high width hexagonal nuts to adequately distribute the load
27. For units above 2m in height, the critical Tightening bolts to strictly have ball bearing boxes.
28. Provide plastic covers over threaded rod extension for protection of threads
29. Connections to be studded port design with connection lining to be of constructed of same plate material and elastomeric liner
30. The plates shall only contact with stainless steel surfaces
	1. The portion of the carrying bar in contact with plates shall be integrated into the carrying bar
31. Accessories
32. Provide insulated stainless steel, drainable drip trays beneath each chilled water heat exchanger
	1. Provide factory fabricated removable and reusable insulation covers for each heat exchanger. The insulation cover shall be designed for easy removal and replacement to facilitate cleaning, inspection and maintenance of plates
33. Spare Parts
34. The vendor / supplier shall be responsible for supporting the spare parts requirement for all the equipment covered by contract
	1. Supplier shall undertake to provide spare parts and related information / documentation, etc. and stock critical parts for short turnaround when ordered

## PART 2 – Execution

1. Preparation
2. Provide concrete base as shown on the drawings
3. Installation
4. Plate and Frame Heat Exchangers
	1. Comply with manufacturer’s recommendation
	2. Locate and mount as indicated on the drawings
5. Miscellaneous
6. Provide ASME approved liquid safety relief valve for hot side and cold side with set pressure in accordance with ASME code. Provide flanged spool piece pipe extension from heat exchanger studded plate to an ANSI class 150 flange. Provide welodlet for safety relief valve and certify spool piece and flange as part of the heat exchanger assembly. One safety relief valve connection required for hot side and one safety relief valve connection for cold side.
7. Factory Test
8. Units to be factory pressure tested as per the below
	1. Each PHE to be factory hydrostatically tested to minimum 1.3 times the operating pressure
9. Field Quality Control
10. Flush and clean all piping before connecting the heat exchangers
11. Ensure that the heat exchangers are isolated from the piping systems during initial stages of piping system cleaning to avoid fouling
12. Field test heat exchangers individually to verify compliance with the design performance requirements. Appropriately calibrated test instruments shall be provided and installed. Field testing shall be witnessed by the service provider.

## PART 3 – Manufacturers

1. Chosen manufacturer must fully comply with the project specification and selected in coordination with the service provider.
2. The Manufacturer should be pressing heat transfer plates in their facility and should have installations more than 15+ years in the region for a minimum of 20 Major Projects .
3. Verify that the manufacturer has an established service Centre within country of installation for a fully established service Centre for reconditioning and gasketing facility.
4. Manufacturer should confirm 24-hour service serviceability to attend faults at project site by a factory-trained engineer
5. All equipment manufacturers / suppliers to provide full after sales, technical and maintenance local support physical existence, tools and spare parts for at least 10 years.

**END OF SECTION – PLATE HEAT EXCHANGERS**