



الجنوب للطاقة
— SOUTH —
ENERGY

South Energy

PHEX Specifications

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District Cooling ETS Guidelines

Furnish and install plate and frame heat exchangers designed with manufacturer's standard fouling allowance and guaranteed to perform to the capacities and pressure drops at the fluid temperatures and flow rates as scheduled. The maximum allowable water pressure drops for the cold and hot sides shall be less than 40 kPa.

Plate Heat Exchangers must be AHRI certified and PHEX arrangements are for 100% of the cooling load.

The plate & frame heat exchanger shall be shipped completely assembled, free standing, full performance and pressure tested at factory, flushed, and cleaned and dried, ready for connection at jobsite.

Where field erection is required, the manufacturer shall pressure test units at factory, flush and clean and dried, then knock-down and properly crated and marked for erection at jobsite. Manufacturer's supervision will be required at jobsite and warranties as factory assembled units remain in effect.

Units shall be pressure rated for PN 16 cold (distribution system side) and for hot (building side) need to suit the pressure rating of the system in the building side, careful calculation to be performed in the high-rise building application with minimum PN16 rating.

Cold side - supply 4.5°C & return 13.5°C and Hot side building return 14.5°C & supply 5.5°C.

The plate unit shall be designed to withstand full design pressure in each circuit independently the entire unit shall be hydrostatically tested according to AHRI, ASME Code, PED Pressure Vessel Code Sect. VIII, Div. 1 for 1.3 x design pressure at maximum working temperature. Numbers of pumps shall match the numbers of serving heat exchangers in addition to one pump stand-by.

MANUFACTURERS

1. Alfa – Laval, Inc.
2. Sondex A/S
3. GEA / Kelvion
4. SONFLOW FZCO
5. Hisaka, Japan
6. Tranter, Inc.; Texas Div.
7. Approved Equivalent to

Heat exchanger manufacturer shall have within UAE limits, a fully established service center with Re-conditioning / Re-gasketing facility. The manufacturer shall confirm 24 hours service availability to attend faults at project site by service engineer. The facilities should be approved and certified. The Supplier to confirm availability locally in UAE of all essential spare parts for the plate heat exchanger proposed. The spare parts for the heat exchangers supplied should be maintained for at least 15 years from the date of supply. Supplier to confirm the presence of Factory trained and Qualified Service Engineer to assist in Installation and commissioning at site. The contractor is to submit three manufacturers from the list and the client has the right to select one of them.

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FRAME COMPONENTS Configuration: Each heat exchanger shall be parallel and counter flow, consisting of heat transfer plate with a built in self-aligning system to accurately locate the plates in the frame assembly. Configuration: Manufacturer to provide partial load analysis and Nozzle loads of the proposed units.

End-Plate Material: Type SS316, 0.6 mm thick. Plate Material: Plates to be AISI 316 stainless-steel with 2B finishes with minimum thickness of 0.5 mm. The frame shall be a single pass design with all inlet and outlet connections on the fixed cover. The fixed and movable covers shall be of sufficient thickness for design pressure and code requirements and shall have no welded reinforcements or stiffeners.

The frame assembly shall be of bolted construction to allow field erection on the site, where required. Welded frame assemblies are not acceptable. The movable cover shall be provided with steel roller bearing for units greater than 1.3 meter height (from bottom of feet) and for units with port sizes 75 mm and larger. This allows the removable cover to be moved without additional rigging or handling equipment. The frame assembly's upper carry and lower guide bars shall be designed to allow for minimum of 25% plate expansion. The portion of the top carrying bar system which comes in contact with the plates shall be stainless steel to prohibit corrosion and facilitate movement of plates. Painted or plated surfaces are not permitted. Provide carbon steel frames, cleaned of mill scale, primed and painted with two (2) coats of baked epoxy enamel. Provide a minimum of two (2) lifting lugs per frame for units with 150 mm ports and larger and designed for lifting assembled flooded unit's flooded weight. The complete assembly to be factory assembled and tested in accordance with ASMEOR PED pressure vessel code requirements and furnished with a certification for the stated design pressure for both circuits.

PLATES Provide Type 316 stainless steel heat transfer plates with herringbone corrugations designed to provide support to adjacent plates to allow pressurization of each circuit to a full differential with no pressure on the adjacent plate channels without deformation of the heat transfer plates. All plates shall be permanently marked to identify quality and material. All ferrous materials in contact with fluids on the hot and cold sides shall be Type 316 stainless steel. Each heat transfer plate shall have built-in self-aligning system to accurately locate plates in the frame assembly and prevent lateral movement and maintain maximum gasket contact under pressure. Plates shall be reinforced on the upper and lower mounting slots to avoid bending on the plates. Overall plate area shall be increased by 10% to account for fouling that will occur as the heat exchanger is being used. Heat transfer plates shall include tapered gasket grooves and shall receive standard IIB finish.

GASKETS: Gaskets shall be one-piece molded Nitrile (NRB) rubber compatible with the fluid shown on the plan and schedule and suitable for working temperature up to 120 degrees C. Gaskets shall fit around the heat transfer area and the port holes without the need for glue or adhesive. Gasket shall be permanently marked to identify quality and material. Gasket to have relieving grooves in the double gasketed areas to prevent any cross-contamination between the hot and cold fluids and cause leak to flow outside of unit.

NOZZLES Provide flanged nozzles (sized as shown on Drawings) on end frames designed for system working pressures as specified. Nozzle velocities shall not exceed 3 m/s at the maximum rate of heat transfer as scheduled on the Drawings.

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BOLTS Compression bolts shall not require the special tools and shall be equipped with lock washers at the movable cover to facilitate opening and closing of a unit from the fixed cover. Compression bolts shall be equipped with captive nuts at the fixed cover and threaded nuts at the removable cover. Welding of the nuts to the closure bolt is prohibited. Bolts shall be provided with rolled threads to reduce galling and double-width hex nuts to distribute the load, plus ball bearing box washers' at all critical closing bolts on all units greater than 1.3 meter height.

INSULATION, DRIP TRAY Factory supplied pre-fabricated insulated cover and drip tray. Removable and reusable panel type insulation cover for the PHE enables expedient removal and replacement of insulation to facilitate removal and cleaning of plates. To facilitate assembly and disassembly the insulation pieces shall be held together with stainless steel "suitcase" type latches. Panels shall be 1 mm Alum-stucco 3s ¾ h exterior plating, 60 mm polyurethane foam insulation, 0.05 mm Aluminum foil inside layer and 50 mm Armaflex lining at the bolt holes. Insulated housing to come complete with a drip tray constructed of minimum 0.75 mm stainless steel plate.

HEAT EXCHANGER Heat exchanger to be factory type tested in the presence of the engineer and client to demonstrate full thermal performance at prevailing lab conditions. The factory testing shall include tolerance as per AHRI LLHE certification program. Performance test shall be witnessed by the client and consultants include for all test charges. Cost shall include full board five stars accommodation, national airline (Emirates) business class for minimum three persons.

NAME PLATES Each exchanger shall have a stainless-steel nameplate permanently attached to the frame. The nameplate shall be mounted off the surface of the heat exchanger to permit the application of 2-inch thick insulation. Nameplate brackets shall be fabricated from thermally nonconductive materials to eliminate sweating. The nameplate shall include as a minimum, the following data stamped on the face of the nameplate:

1. Customer order number.
2. Equipment designation.
3. Year manufactured.
4. Hot and cold side design.
 - a. Temperatures.
 - b. Working pressures.
 - c. Design flow rates.
 - d. Pressure differentials at design flow rates.
5. All information required for plate pack compression.
6. Model and serial numbers.

ACCESSORIES

Provide factory fabricated insulation for each plate heat exchanger. Diffusion tight insulation, pre-cut holes and an adhesive tape on the back for simple assembly. The insulation material shall be NBR foam that eliminates condensation. Brazed PHEs shall be free drip tray.

QUALITY & PERFORMANCE

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The design and manufacturing of the products must have Quality System Conformity Certificate which certifies that the capabilities shown by the manufacturer and their quality system are in accordance with the demands of the Pressure Equipment Directive PED (2014/68/EU) regarding to the conformity evaluation Module H1. - The manufacturer must have valid ISO 9001:2008 and ISO 14001:2004 Certificates.

All plate heat exchangers must be AHRI Certified to the Liquid to Liquid. - All plate heat exchangers must be warranted against faulty materials or poor workmanship for at least two years from the site delivery date.

PART 3 - EXECUTION

INSTALLATION GASKET TYPE Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction. All installation shall be in accordance with manufacturer's published IOM and recommendations. Provide a competent, factory trained representative to completely supervise the installation and to perform all on-Site tests. Install to permit disassembly of plate pack with minimum disturbance to piping and equipment. Support heat exchangers on 150 mm housekeeping pads. Install heat exchanger on a reinforced concrete housekeeping pad extending 300 mm beyond the heat exchanger frame in all sides. Area below plates shall be tapered to 75 mm to form a drainage basin, with integral floor drain. Coordinate drain location and provide venting and drain valves for servicing of unit. The plate heat exchanger shall be tested to full test pressure of 1.3 times the design pressure in one circuit with zero pressure in the alternate circuit. Hydrostatic test shall be in accordance with ASME Section VIII, Division 1, and paragraph UG-99. Pipe relief valves to nearest floor drains, Pipe drain and vent valves to nearest floor drain. Provide thermometers, wells and temperature and pressure indicating gauges in supply and return piping at the hot and cold side connections of the exchanger. Also, temperature sensors and differential pressure transducer, test points, strainer.

A certified test report of all data shall be submitted to the Engineer prior to Substantial Completion. An officer of the manufacturer's company shall sign the field certified test report. Preprinted certification will not be acceptable; certification shall be in the original.

CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Maintain manufacturer's recommended clearances for service and maintenance. Install piping connections to allow service and maintenance of heat exchangers.
- C. Install piping with flanged connections at heat exchangers.
- D. Install shutoff valves at heat exchanger inlet and outlet connections.
- E. Install relief valves on heat exchanger heated-fluid connection.

CLEANING After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

COMMISSIONING

- A. Verify that heat exchangers are installed and connected according to the Contract Documents.
- B. Adjust flows and controls to deliver specified performance.

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C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain heat exchangers as specified below:

1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining heat exchangers.
2. Review data in maintenance manuals. Refer to Division 1 Section "Contract Closeout."
3. Review data in maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
4. Schedule training with Owner, through Engineer, with at least seven days' advance notice.