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ITT

Heat Transfer

BrazedPlate Heat Exchangers

Installation, Operation and Maintenance Manual



Engineered for life

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Installation
of ITT Brazed Plate Heat Exchangers

1. Upon receipt of the exchanger, inspect for shipping damage, especially to the connections. If damage is extensive, notify the carrier immediately. Finally, check the heat exchanger against proper drawings and spec sheets to make sure everything is as expected.

2. Before piping up, inspect all openings in the heat exchanger for foreign material. Remove all plugs and shipping covers immediately prior to installing. Make sure it is thoroughly cleaned to remove all preservation materials, if any were used, unless the material is soluble in the system fluid.

3. For single phase fluids, the heat exchanger can be mounted in any orientation that is convenient and should be piped in a counter current, parallel flow arrangement. For two phase fluids, the heat exchanger should be mounted vertically and piped as shown in Figure 1 and Table 1. Connections may be either on the front or back of the exchanger.

REFRIGERATION:

Condensers

Refrig. In: F1
Refrig. Out: F4
Liquid In: F3
Liquid Out: F2

Evaporators

Refrig. In: F4
Refrig. Out: F1
Liquid In: F2
Liquid Out: F3

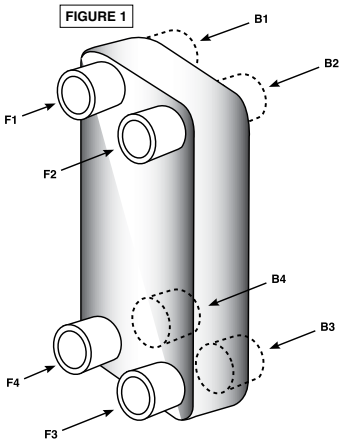
STEAM TO LIQUID

Condensers

Steam In: F1
Condensate Out: F4
Liquid In: F3
Liquid Out: F2

TABLE 1

FIGURE 1



4. Provide air vent valves for the heat exchanger so that it can be purged to prevent or relieve vapor or gas binding.

5. Install proper relief valves and temperature alarms to make sure the heat exchanger is not subject to conditions beyond the intended design.

6. Do not weld or braze brackets or attachments directly to body of heat exchanger.

7. For soldering type connections, braze with minimum 45% silver solder and at maximum 1200° F. For welded type connections use TIG or MIG welding. Avoid overheating. A wet cloth or rag should be placed around the base of the connection. A Nitrogen purge should be used to avoid internal oxidation. Braze or weld with exchanger in the vertical position.



CAUTION:

Many Heat exchangers circulate fluids which are irritating or dangerous to the human system. These fluids could cause problems if bolted or threaded joints are not maintained in a leak tight condition at operating pressures, temperatures, and no flow, ambient conditions.

Even if fluids are not irritating or dangerous, a leak could cause a slippery situation on the floor below.

Since one fluid in the heat exchanger is at a higher temperature, any leaks may cause burns.

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8. The nozzle connections are designed for normal torque force and damage may occur if over tightened. The use of pipe sealant materials compatible with the system fluids is recommended for threaded type connections. Connection load limits should be observed and are shown in Figure 2, Table 2, and Table 3.

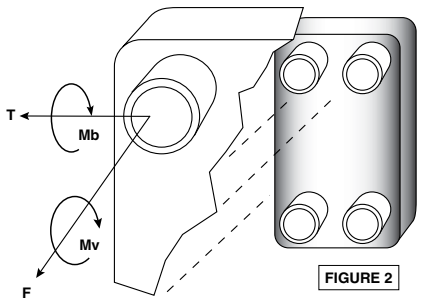


FIGURE 2

435 psig Standard Design

Model	T (lbs)	F (lbs)	M_b (in-lbs)	M_V (in-lbs)
400	3327	1798.4 (-1348.8)	327.5	1504.6
410 411 412	5552.6	1798.4 (-1348.8)	540	1504.6
415	5552.6	2158.1 (-1663.5)	540	3407.5
422	24952.8	6069.6 (-4720.8)	6550	8912.7
433	Consult	Factory	Consult	Factory

TABLE 2

150 psig Pressure Design

Model	T (lbs)	F (lbs)	M_b (in-lbs)	M_V (in-lbs)
400	200	100	20	200
410 411 412	280	130	27	300

TABLE 3

Operation

1. Be sure the entire system is clean before starting operation to prevent plugging of passages with debris. The use of strainers or settling tanks in pipelines leading to the heat exchanger is recommended. The recommended strainer size is 20-24 mesh.

2. Start operating gradually. See Table 4 for suggested start-up and shut-down procedures for most applications. If in doubt, consult the nearest ITT Heat Transfer representative for specific instructions.

3. Do not operate the heat exchanger under pressure and/or temperature conditions in excess of the specified design limits shown on the nameplate attached to the heat exchanger.

4. Drain all fluids when shutting down to eliminate possible freezing and corroding.

Type of Fluid	Relative Temperature	Type of Fluid	Relative Temperature	Start-Up Procedure	Shut-Down Procedure
Liquid	Hot	Liquid	Cold	Start both fluids gradually at the same time.	Shut down both fluids gradually at the same time.
Gas	Hot	Liquid	Cold	Start cold fluid first then hot fluid.	Shut down hot fluid gradually then cold fluid.
Condensing Gas	Hot	Liquid	Cold	Start hot fluid first then slowly start cold fluid. Avoid temperature shock.	Shut down cold fluid first then hot fluid.
Liquid or Gas	Hot	Vaporizing Liquid	Cold	Start hot fluid first then cold fluid.	Shut down cold fluid first then hot fluid.

TABLE 4

CAUTION:

A heat exchanger is a pressure vessel designed for operation at certain specific limits of pressure and temperature. The cooling or process system, which includes the heat exchanger, must be safeguarded with safety valves and controls so that these heat exchanger design conditions are not exceeded. All operating personnel should be made aware of these specific design pressures and temperatures.

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Maintenance

1. Clean exchangers subject to fouling (scale, sludge deposits, etc.) periodically, depending on specific conditions. A sludge or scale coating on the plates can reduce effectiveness. A marked increase in pressure drop and/or reduction in performance usually indicates cleaning is necessary.

2. As suggested under "Operation", the use of a strainer is recommended if the fluid quality is poor (extensive dirt, debris, and contaminants). If the fluids are relatively clean, there should be little problem with fouling so periodic cleaning is adequate.

3. Some suggested methods of cleaning either side of the heat exchanger are listed below:

- Back flush with a high pressure stream of hot water to remove loose deposits.
- Circulating hot wash oil or light distillate will usually effectively remove sludge or similar soft deposits.
- A5% solution of Phosphoric Acid or Oxalic Acid may be effective in removing more stubborn deposits. For optimum results, the solution should be in a back flush type flow pattern. Rinse heat exchanger with clean fresh water after use. It is recommended that the refrigerant circuit not be chemically cleaned.

4. If the heat exchanger is excessively fouled and it cannot be cleaned by commercial cleaning methods, then replacement of the unit is suggested.

NOTE: Use in accordance with the manufacturer's instructions and check that cleaning compounds are compatible with the materials of the heat exchanger. Since there are a wide variety of cleaning compounds available which are compatible with certain metals and alloys, it is recommended that you contact a representative of the above commercial cleaning products to determine which particular cleaning fluid they would suggest for your type of scaling problem.

CAUTION:

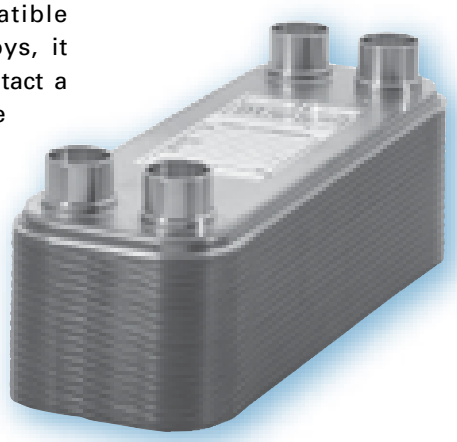
When the heat exchanger is cleaned, it is important that full characteristics of the fouling material and the cleaning agent be known and care exercised in handling them according to instructions. Use eye protection to prevent damage to your eyes. Wear a respirator when required.

CAUTION:

Do not exceed design conditions of heat exchanger during operation or maintenance.

CAUTION:

Brazed plate heat exchangers have exposed sharp metal surfaces. Protective gloves are recommended during handling.



Warranty

Seller warrants only that it will furnish by freight a replacement for, or at its option repair, any product of its manufacture or part or portion thereof, proved to its satisfaction to be defective in material or workmanship under normal use and service within one (1) year from the date all other equipment or part thereof is first placed in use, or two (2) years from the date of shipment, whichever shall be less. See ITT terms and conditions of sale for details.

For more information, please contact:

Heat Transfer

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Formerly **AMERICAN-STANDARD**™ HEAT TRANSFER DIVISION

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