

HFM Plate&Shell Heat Exchanger Operation Manual

1. Preface

This manual could help you to correctly install, debug, repair and troubleshoot the plate and shell heat exchanger. We strongly advise that you read this instruction carefully before installing or starting the device.

The most common material we use in the plates is 304SS(06Cr19Ni10), the service temperature is $-196^{\circ}\text{C}\sim 350^{\circ}\text{C}$, and it easily and sensitively reacts with chlorine-containing media (such as cooling water), which leads to corrosion especially in some crevices. When the medium is water (purified water), the application of 304 stainless steel in chlorine (Cl^-) aqueous solution, the best conditions (mg/L) are as follows:



Material	The Maximum Cl^- Content In the Following Temperature of Fluid Between Plates			
	25°C	50°C	75°C	100°C
304SS	100	75	40	<20

2. Working Principle

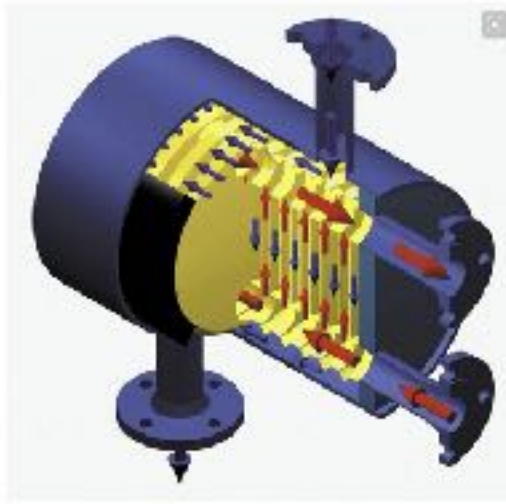


Structural principle

The plate and shell heat exchanger is composed of many heat exchange plates (metal thin plates stamped with corrugated grooves), which are sealed by welding at a certain interval, as shown in Figure 1.

The holes in the corners form a continuous channel. Media enters the channel from the inlet and is distributed into the flow channel between the heat exchange plates. The two fluids enter the channels respectively. The plates are separated.

Under normal circumstances, the two media flow counter currently in the channel. The heat medium transfers heat energy to the plates, and the plates transfer heat energy to the cold medium on the other side, so that the temperature of the heat medium is reduced and cooled. The temperature of the cold medium is increased for the purpose of heating. (As shown below)



3. Operation and Shutdown

3.1. Check before starting

- (1) Whether the pipeline connection meets the requirements before starting;
- (2) Whether the drain (dirt) valve is closed.

3.2. Operation

- (1) Slowly open the cold medium inlet and outlet valves and then slowly open the hot medium inlet and outlet valves. The pressure and temperature should be increased slowly. In order to stabilize the operation of the system, the amount of fluid on both sides can be adjusted simultaneously.
- (2) The vent hole must be opened when filling the liquid, and the vent hole must be closed after the exhaust is completed.
- (3) According to the inlet and outlet pressure and temperature instructions, adjust the valve to reach the set process parameters.
- (4) During operation, the pressure should be stable to avoid sudden highs and lows.
- (5) Carefully observe the operating conditions of the heat exchanger, such as temperature and pressure.
- (7) If the heat exchanger is running as planned, then the heat exchanger can be put into normal use.

Note:

- All heat exchangers have been hydraulically tested before leaving the factory, and the test pressure is 1.25 times the design pressure.
- For plate heat exchangers assembled with austenitic stainless steel plates, the chlorine ion content in the medium used shall not exceed 25ppm.



3.3. Shutdown

(1) Close the heating medium inlet valve first, then close the cold medium inlet valve. All inlet and outlet valves of the heat exchanger should be closed.

(2) If the downtime could be very long, the valve at the lowest part of the pipeline should be opened to drain the residual liquid in the equipment.

4. Maintenance

In the actual operation process, the wall surface of the plate will be scaled for a long time. After a cycle of operation, it is recommended to use a special cleaning fluid for the heat exchanger to clean it, and then clean it with water after the cleaning is completed to ensure that there is no cleaning agent residue in the heat exchanger liquid. If the heat exchanger is installed in a dark and humid place, it is recommended to paint the surface of the heat exchanger for anti-rust treatment every year.

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