# Performance Test Process of Plate Heat Exchanger

REQUIREMENT

Prototype design data and test parameters

a) Number of plates
b) Plate thickness
c) Plate material
d) Corrugated form and geometric dimension of plate
e) Tightening length
f) Plate spacing
g) Equivalent diameter
h) Heat transfer area
i) Cross sectional area of runner
j) Process combination
k) Design temperature
l) Design pressure
m) Maximum allowable pressure drop

The determination and calculation methods of the above design data and test parameters shall be in accordance with the requirements of API662 standard.
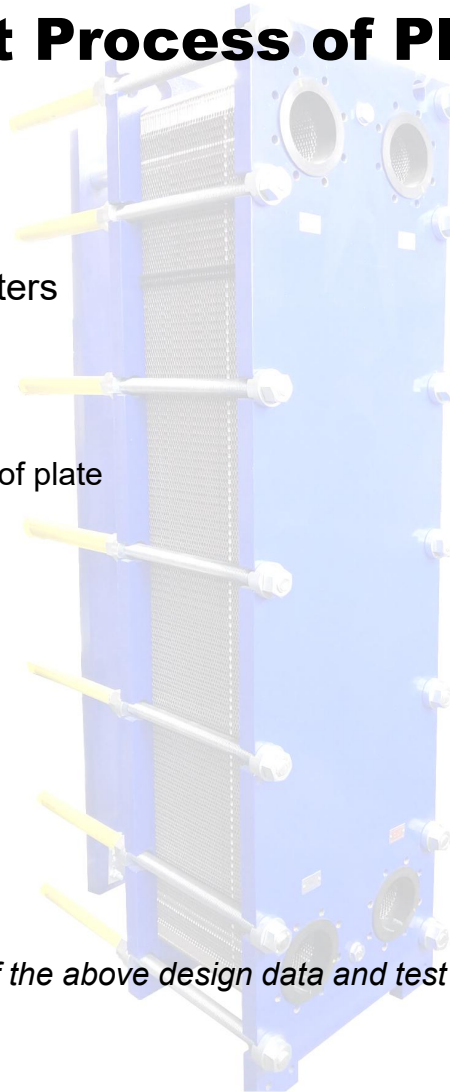
TEST PROCEDURES

1. The reliability of the test prototype, pipeline and measuring instrument shall be checked before the test.

2. The gas in the test prototype shall be drained in time after starting the operation to make the test prototype run under the condition of completely filling the test fluid. And adjust the flow and temperature to the standard test conditions.

3. After stable operation for 30mins under standard test conditions, the test shall be carried out according to the following test requirements:

- The flow rate of fluid on both sides changes uniformly from 0.1m/s to 1.0m/s, and the change interval shall not be less than 0.1m/s;
- The flow velocity of the fluid on the fixed side (hot side or cold side) remains unchanged, and the fixed point should be about 0.5m/s. The flow velocity of the fluid on the other side should change from 0.1m/s to 1.0m/s, and the change interval should not be less than 0.1m/s;
- After each test point is stable for 5min, and the relative error of heat balance between cold and hot fluid is not greater than ±5%, data collection can be carried out; At least 3 groups of data shall be collected synchronously at each test point.
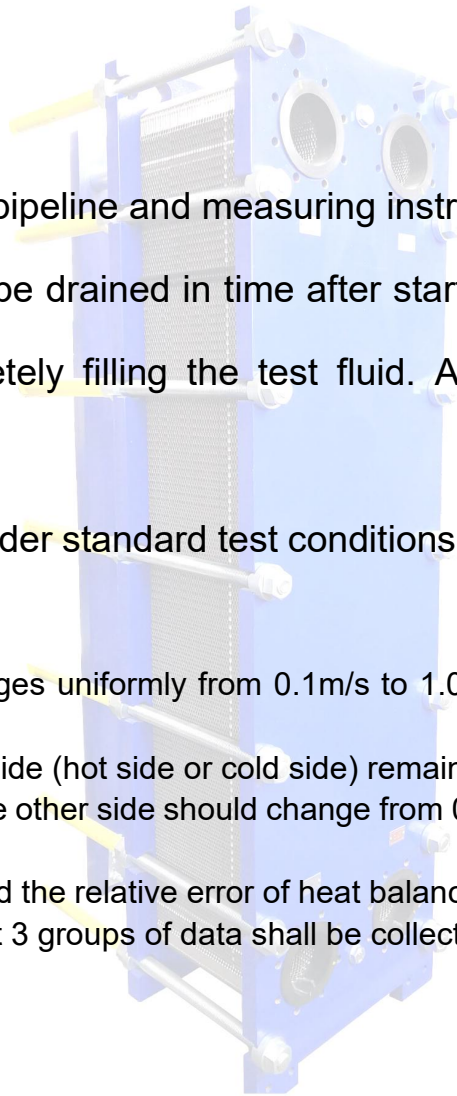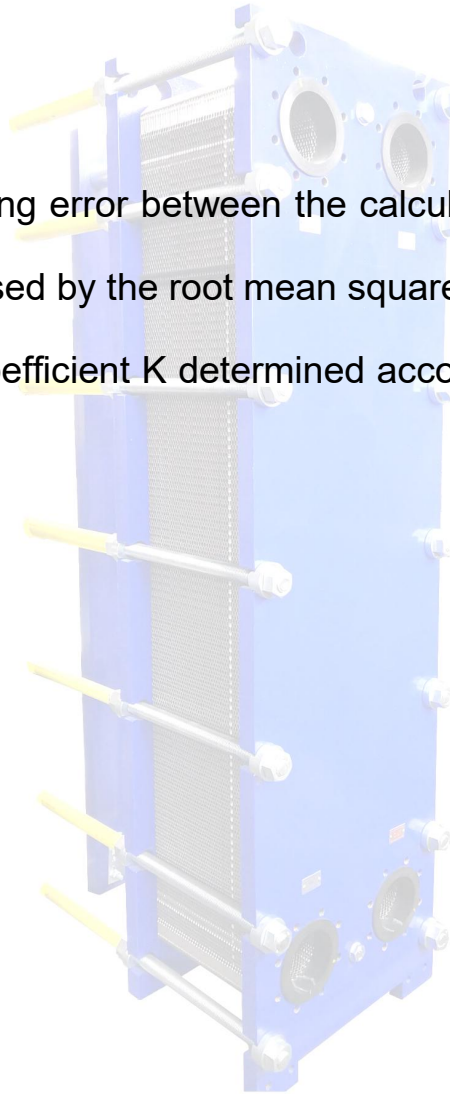
DATA ANALYSIS

1. Give the test curve of total heat transfer coefficient K and flow rate U

2. In the same coordinate system, draw the relationship curve between total heat transfer coefficient K and flow velocity u under different qualitative temperatures

3. The criterion relationship between Nusselt number Nu and Reynolds number Re is summarized

4. Give the test curve of pressure drop $\triangle$ P and flow rate U

5. In the same coordinate system, draw the relationship curve between pressure drop $\triangle$ P and flow velocity u under different qualitative temperatures.

6. The criterion relationship between Euler number EA and Reynolds number Re is summarized

7. Give the total heat transfer coefficient K, pressure drop $\triangle$ P and specific pressure drop J of liquid-liquid countercurrent operation on both sides of the heat transfer surface when the qualitative temperature is hot fluid 50 ℃, cold fluid 30 ℃ and the flow rate of cold and hot liquid is 0.5m/s.

DEVIATION

➢ Data processing summarizes the fitting error between the calculated value and the test value of the criterion relationship, which should be expressed by the root mean square error, which should not exceed 5%.

➢ The error of the total heat transfer coefficient K determined according to the test method specified in this part shall not exceed ± 10%.