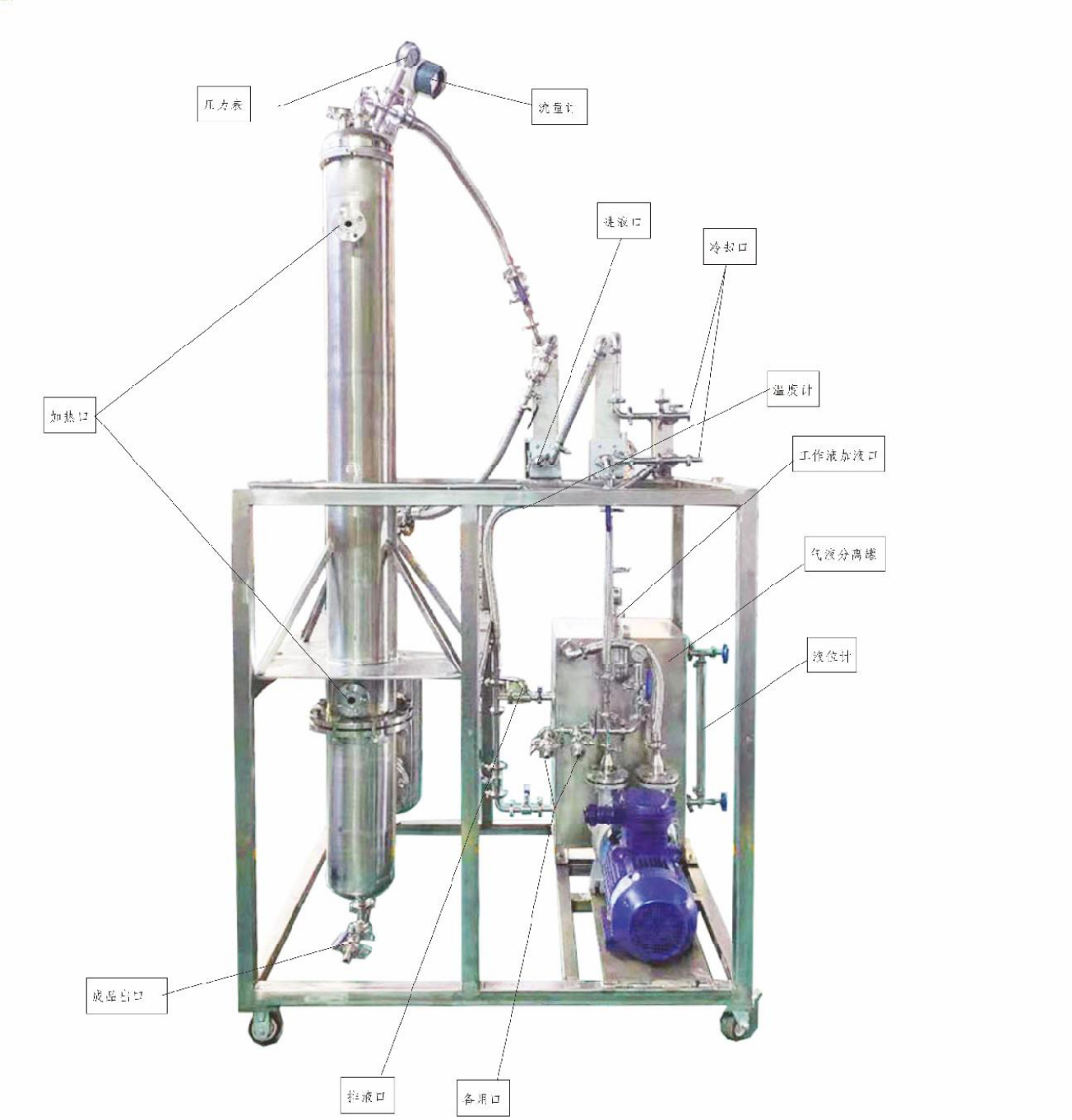
Specification.parameter.performance.



1.1 Evaporator specification, model

1.1.1 Evaporator Name、Model:FFE

1.1.2 Evaporation capacity specification：250L/h

1.2 Evaporator process parameters

1.2.1 rate of Total material flow:250L/hr

1.2.2 Total evaporation rate：250/hr

1.2.3 The material process：heat exchanger→ tubulation →Discharge

1.2.4 The evaporation process：tubulation→condenser→heat exchanger→Alcohol recovery tank

1.2.5

Heat transfer area：2.4m^2

1.3 Evaporator performance

1.3.1 material：Alcohol extract

1.3.2 Materials Entrance：Into the evaporator

quantity：250L/hr

temperature：-40℃

1.3.3 Material Exit：triple-effect discharge

quantity：4000kg/hr

temperature：65-70℃

concentration：75-80%（DS）

electrical energy（installed power）： 50.2kw+5.5kw+11.05kw

Electricity: 220v, 60Hz，3 相

2. Process description

To better understand use process flow chart

In order to get the correct results, you should know each process line on site。

In case of failure or emergency, you must be very familiar with the physical location of the components and the engineering layout of the piping。

2.1 Material

The whole system is powered by a ring-liquid vacuum pump, and the concentrated material is transported to the heat exchanger through 1 (feed port), which reaches the distributor at the top of the evaporator after the heat exchanger is pre-heated by steam

Liquid membrane flow down on top of the tube in the process of acceleration, due to the gravity and the formation of liquid under the action of steam flow rate increases, the evaporator through external thermal oil heating, steam and some condensed material from evaporator, most of the liquid is stored in the bottom of bunker, a small amount of liquid and steam by connecting pipe to the separator and liquid in the separation, retained at the top of the steam entering the condenser cooling.The condensed liquid alcohol enters the gas-liquid separation tank through the ring liquid

pump, and the liquid phase reaches the room temperature through the heat exchanger and enters the alcohol recovery tank.

3. Evaporator protection（Water test）

In order to avoid damage to equipment and equipment due to vacuum system (design equipment strength according to each vacuum condition), equipment components will not be damaged under vacuum condition.Check the overvoltage protection by following these steps

To detect vacuum leakage, all evaporators are filled with water, the first is the separation chamber, then the pipe, and finally the shell, pay attention to the test should be located at the bottom of the top tube plate vent plug open to avoid pressure accumulation, (air compression) to prevent excess supply system pressure.The water pressure injected into the separator is approximately 3m or less than 0.3kg/cm2.This value shall not be exceeded without the approval of the designer.

4. Evaporator operation

4.1 Overview operation

Before starting up the operation, do the preparatory work first, add the working fluid (alcohol) to the gas-liquid separator tank to 400mm scale (no load will cause the water pump to dry grind and seal failure), close the two spare ports and the inlet valve, and open the outlet valve.Make the vacuum of the separation chamber rise. When the vacuum degree of each effect separation chamber rises to the specified value, to -0.09mpa,.Slowly open the feed valve and feed to the evaporator.Sample the finished product from the finished product mouth and test the finished product concentration value. When the finished product concentration is qualified, open the finished product discharge valve.

4.2 Operating instructions

4. 2. 1 prepare

Check if any problems occurred in the work record before operation. After repair and correction, check if relevant flanges, mirrors and manholes are fastened in their respective positions；

Check the power supply of the distribution cabinet;

Before starting the machine, check whether the vacuum pump meets the normal operating

conditions (the liquid level reaches the center line of the liquid window), and manually turn the pump couplings without jamming;

Check whether the material valve and water valve can be closed strictly to reach the use state;

Check the condensing system;Check the lubricating oil level of each pump. If the lubricating oil is insufficient, fill it in time to ensure sufficient lubricating conditions of each pump.

Start the condensate circulation system and open the manual valve. The cooling water flows through the condenser to see if there is any condensate flowing out of the condenser.

Start the thermal oil circulation system and open the manual valve to circulate the oil through the evaporator to see if there is any thermal oil flowing out of the interface.

4.2.2 Reagent

Open the reserved opening on the top of the gas-liquid separation tank and add the starting alcohol to the 400mm scale line.

4.2.3 vacuumize

The equipment is ready to vacuum, and the vacuum pump is started to make the system vacuum reach 0.085~0.095.

Note: if the vacuum degree is less than 0.085 within 3 minutes, look for leaks.

4.2.4 preheating evaporator

Turn on the oil bath system to heat the evaporator.

When the condensate appears on the mirror, start the cold water pump.

4.2.5 Prepare production

There is no overflow or condensate deposition in the separation tank. After checking the normal level of the feed tank, open the feed valve and pump the material into the equipment.

4.3 commissioning

The following preparations should be completed before the test:

⑴ All installation and maintenance work has been completed;

⑵ The valve flanges of all pipelines have been tightened;

⑶ Connection flanges of all equipment have been tightened;

⑷ All l the equipment has been checked to work normally.

⑸ Check the lubricating oil level of each pump, if the lubricating oil is insufficient, it should be filled in time to ensure that the pump has sufficient lubrication conditions;

⑹ The rotation direction of the pump is checked to be correct.

5. Cleaning

The purpose of cleaning is to wash away residues and scale formed in contact with the material. The quality, strength and hardness of the residues depend on the following factors:

A The running time of the evaporator

B Quality and composition of materials

C The temperature of the evaporator

D The final concentration of the system

If you stop temporarily or for a short period of time, only clean with water. If you stop suddenly or for a long period of time, clean with chemicals；

Depending on the condition of the equipment, the cleaning agent can be used many times. The liquid residues that have been used many times are discharged at the bottom of the cone of the tank and then cleaned with clear liquid

Clean the order

A Clean with condensed water 30min

B Wash with lye（2~5%） 60min

C Clean with condensed water 30min

D Clean with water 45min

The working hours are only recommended, based on actual cleaning experience, especially lye conditions.

attention

Any flanges that have been opened, mirrors, etc., should be noted in the daily work diary. These are the most likely locations for leaks in the event of a vacuum problem.

6. Close

Do not close the evaporator without reducing the steam and feeding of the running material;

After running the material, run the water and turn off the cooling equipment properly.

Lower the temperature of thermal oil heater to 50℃;

Shut down vacuum pump

To maintain the vacuum of the evaporator, continuous trouble-free operation is required. For this, see operation overview and troubleshooting.

Shut down the refrigeration pump

6.1 emergency close

① Sudden power failure

Turn off the heat conducting oil heater immediately, then turn off all pumps.

When the power supply is back to normal, pull out all materials and clean the equipment, cleaning the running materials with water or lye.

② No coolant

Stop or interrupt supplies and empty equipment

③ Use up or not enough liquid to be treated;Technical process disorder;There is a technical fault in the equipment piping.

7. troubleshooting

7.1 The vacuum is too low or the temperature is too high

Probably:

① Manhole leakage, pump gasket pump cover leakage.Defective valve not secured by defective gasket or screw;

② insufficient cooling water flow or cooling water inlet temperature higher than the specified value;

③ thermal oil flow rate is lower than the specified value.

④ vacuum pump failure, check whether the seal is damaged.

⑤ The liquid level in the gas-liquid separation tank is too low.

7.2 Liquid accumulates in the separator

Probably:

① pump gasket leakage

② pump parts loose

③ finished product export fouling blockage

If materials continue to accumulate, please refer to the above reasons

7.3 The final concentration is low

Probably:

① Set in the specified operating conditions, especially the heat conduction oil flow is too small, heating surface scaling, some evaporator scaling blockage

② the condenser drain exhaust is not sufficient if the exhaust pipe is cold, it means there is leakage or orifice block.

7.4 Equipment capacity reduced

If the equipment is operated in accordance with the specified requirements, it is generally due to equipment scaling and equipment capacity gradually reduced.

7.5 Problems and solutions are easy to occur in strip operation

⑴ The feed quantity is below the design value

1.） Final concentration rise　　1.） Increase feed volume

2.） The evaporator scales　　2.） Reduce the amount of heat conducting oil

⑵ The feed quantity is higher than the nominal value

1.） Final concentration reduce　　1.） Reduce feed volume

2.） The separation chamber level rose　　2.） Increase the amount of heat conducting oil

⑶ Feed temperature above 60℃

1.） Final concentration rise　　1.） Reduce the amount of heat conducting oil

2.） scaling　　2.） Increase feed

3.） Vacuum reduction　　3.） Increased cooling water

⑷ Feed temperature is too low

1.） Final concentration reduce　　1.） Increase the amount of heat conducting oil

2.） The separation chamber level rose　　2.） Reduce feed volume

⑸ Feed concentration is too high

1） Final concentration reduce　　1） Increase feed

2） scaling　　2） Reduce the amount of heat conducting oil

⑹ Low feed concentration

1） Final concentration reduce　　1） Reduce feed volume and Increase the amount of heat conducting oil

2） The separation chamber level rose　　2） Reduce feed volume

⑺The amount of heat conducting oil is too low

1） Final concentration reduction　　1） Reduce feed volume

2） The separation chamber level rose　　2） Increase the amount of heat conducting oil

⑻ Low vacuum

1）The temperature is too high　　1）Additional cooling water

Maybe other temperatures are high

2）The concentration goes down which means there's not enough evaporation　2）Check vacuum system

3）Feed temperature is too high　　3）Additional cooling water

⑼ Evaporation is too low

1）The final concentration is too low　　1）If not, check whether the feed quantity is too high

2）The separation chamber level rose　　2）Low feed concentration (vacuum problem)

⑽ The final concentration is too low

1）Evaporation is less　　1）Increase the amount of heat conducting oil If not, check whether the feed quantity is too low

2.）The separation chamber level rose　　2）Low feed concentration

3.）High temperature (vacuum problem)

⑾ The final concentration is too high

1）More Evaporation　　1）Reduce heat conducting oil or increase feed

2）Scale may form in the evaporator　　2）Feed concentration is too high

The above describes feasible measures to be taken when process parameters change, but this is only when one value changes, and in many cases two or three value changes can affect the evaporator at the same time(e.g., low evaporator concentration accompanied by a sudden drop in heat conducting oil) one possible step is to drastically reduce the amount of feed.

The following conclusions can be drawn from the above comments

If you decide to change the heat transfer oil or feed flow, change only one at a time and wait for the result. Do not change the heat transfer oil and feed flow at the same time.It's faster to change the heat conducting oil than it is to change the feed flow because the heat conducting oil changes while the feed is constant, and it's important to look at the temperature of the separator so that you can tell if the evaporator is running correctly.

8. Initial start-up preparation

⑴ The evaporator must be installed.

⑵ All piping and piping systems have been installed, secured and sealed.

⑶ The heat conduction oil pipeline has been tested by water and heat preservation is done.

⑷ Install and support cooling water pipes.

⑸ Complete the insulation work.

⑹ complete the installation of equipment and control cabinet instruments.

⑺ Install the vacuum gauge pipeline including support and protection pipeline.

⑻ Being the motor line installed.

⑼ All the top water washing line 'levies to open the evaporator.

⑽ separator, the bottom of the pump inlet pipe cleaning equipment to remove visible dust.Weld fragments should be washed with water.Turn off the equipment and tighten all connections.

⑾ test pump running to check water, noise, steering is consistent with the requirements of the motor.

8.1 Water test

1.Possible leakage can be detected by testing water in shell and pipe

2.Open the inlet valve

3.Close the spare valve

4. Start the vacuum pump to supply water to the evaporator and observe the leakage below.

Please note:

The maximum pressure in the whole process shall not exceed 0.15mpa.

8.2 Cooling water circulation

Open the water inlet valve of the condenser, start the cooling water circulation pump to feed condensed water into the condenser, close the water inlet valve and stop the cooling water pump when the pipe pressure reaches 0.1mpa.

8.3 Steam cleaning line

Steam fitting connectors are removed and the steam pipe is blown with 1-2bar compressed air for approximately 15 minutes.

9. vacuum experimental

⑴ To the vacuum pump for fluid, start.

⑵ Read and record the vacuum.

⑶ When the vacuum reaches 200mbar, close the liquid ring vacuum pump.

If the vacuum does not reach 250mbar within 5 minutes, look for major leaks, usually through sound testing (evaporator pipe flange, top cover, instrument interface)If the vacuum does not reach

300mbar after 10 minutes, shut off the vacuum pump and all outer noise.

If for further inspection, continue vacuuming, inject tap water into the separator and exceed the scope, check for bubbles in the pump area and in the pump duct, check for pump seals, stop sealing water supply, and check whether the pump is aspirated through a dry sealing pipe.

attention

Continuous test shall be conducted before the designed vacuum degree is not reached within 5 minutes. When the vacuum pump stops working, the vacuum degree shall be reduced within 12 hours and shall be qualified if it does not exceed 50mbar.If the vacuum test has been qualified, continue the water test.When the water test is stable, the evaporator can be fed.

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