

PHE Cleaning Operation Manual



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Before Disassembly

On-site Preparation:

- 1.1. Check the equipment code and name.
- 1.2. Confirm that the pump has been stopped and safety measures have been implemented.
- 1.3. Clean up the equipment and surrounding area and circle the worksite.
- 1.4. The water discharge pressure of the maintenance main pipe is zero.
- 1.5. Confirm that the valves on both sides of the open-close type are closed.

Before Disassembly:

2.1. Measure and record the original dimensions of the removed plate pack.

- 2.2. Clean the thread of the compression bolt.
- 2.3. Apply a thin layer of butter or lubricant on the outside of the thread.

2.4. In order to ensure the installation order of the plates, a diagonal mark will be painted on the heat exchanger.

Disassembly:

3.1. Use a special wrench to loosen the compression bolts 10mm one by one according to the diagonal principle, and repeat two to three rounds until the tension of the panel bundle is reduced and clear.3.2. After removing all the tightening bolts, move the movable cover to the side of the support frame to contact the plate.





Physical Cleaning



1.1 After disassembling the heat exchanger, you can pull the plates to the other side of the support frame, and rinse both sides of the plates with warm water and a soft brush. Pay attention to protect the gasket to prevent it from being damaged and loose.

1.2. If it is necessary to remove the plate from the support frame and clean it, make sure that the installation sequence is correct (mark it before disassembly).

1.3. For dirt that is difficult to remove, you can use an open soaked in chemical cleaning agent or choose a detergent that can remove the dirt without damaging the plates and sealing materials, and must be guaranteed from the cleaning agent licensee.

1.4. In view of the scaling phenomenon on the cold side of the plate heat exchanger, after removing the gasket from the plate, it is recommended to use 1.5% nitric acid or oxalic acid (temperature below 65°C) for submersion and immersion. Observe the scaling and detachment during the immersion process After acid pickling, rinse the remaining acid with water.

1.5. The plate oil cooler needs to be cleaned of the oil side oil (recommendation for oil pollution treatment: after removing the gasket from the plate, completely soak it with a special oil stain cleaning agent, rinse with clean water. Ensure the gasket groove when installing the gasket There is no foreign matter in the inner contact surface of the gasket and the front surface of the gasket.

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Chemical Cleaning



Pickling:

2.1. When adding acid to the system, the corrosion inhibitor should be added first, and the cycle should be even. When adding acid, strengthen monitoring to prevent the acid concentration from being too high. If the cleaning tank has a lot of foam, it can be sprayed on the surface of the foam to eliminate it.

2.2. When the acid concentration is less than the specified value of the process design, add acid and corrosion inhibitor in time to make the concentration reach the selected formula range. When the acid concentration is stable for 1 hour, no gas is generated in the acid liquid at the inlet and outlet, and the pickling can be ended.

2.3. Water flushing requires a cyclic flushing method, the flow rate should be greater than the pickling flow rate, and the pH value of the effluent at the end of the flushing should not be less than 4.3.

2.4. Pickling chemicals and parameter control:

Nitric acid: 2~6%; 65% nitric acid 80~140Kg. Corrosion inhibitor: 0.3~0.5%; corrosion inhibitor 2.5~4Kg. Time: 4~6 hours (depending on the test results) 4.2.5.

Determine the cleaning end point according to the following conditions:

A. The acid concentration of import and export is close to equilibrium, and is greater than 2.0%, maintain for 1 hour.

B. No gas is generated in the outlet acid.



Chemical Cleaning

Alkaline washing

3.1. Alkaline washing process:

Through water washing-alkaline washing-water washing, the internal slime, microorganisms, and some calcium sulfate scales in the cooling pipeline are removed. After alkaline washing, water washing should be carried out, and the cyclic washing method is used to wash, and the pH value of the effluent at the washing end is not greater than 9.0;

3.2. Alkaline washing drugs and parameter control:

Trisodium phosphate: 0.5-1%; 4.2~8.40Kg. Auxiliary (surfactant): 0.05%; Time: 48h

3.3. Establish a cycle according to the chemical cleaning process of the system. Alkaline washing drugs are formulated into a solution through the cleaning tank, and the alkali washing is performed according to the alkali washing control parameters, and the alkali washing until the system outlet and inlet lye concentration tends to be stable;

3.4. After alkaline washing, rinse with water, using circulating rinse. In this flushing phase, samples are taken and tested every 15 minutes until the PH value is less than 9.

Cleaning Process	Methods	Picking point	Program Tim	e	Ending Point	Explanation
Alkaline washing process	Alkaline washing	entrance and exit	Phosphate concentration temperature	1h	Phenolphthalein alkalinity is stable	At the end, keep a sample to determine the alkalinity, silica, oil content, and sediment content
	flashing	entrance and exit	ph value	30min	pH value<9.0	Take a sample every 30 minutes
Pickling washing process	Pickling washing	entrance and exit	Acid concentrati Iron content temperature	^{on} 30min	acidity balance	Take simple of he average value of the total iron content
	flashing	entrance and exit	ph value	30min	pH value>4.3	Take a sample every 30 minutes

Appendix table: Requirements for chemical cleaning test items

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Installation process

4.1. Tilt the plate counterclockwise and install it on the top guide rod;

4.2. Position the plate vertically and check whether there is any foreign matter on the contact surface between the gasket and the plate;

4.3. Install the plate on the bottom positioning bolt and make it slightly inclined;

4.4. Push the movable cover to the side of the plate bundle;

4.5. Install the compression bolts. According to the principle of diagonal squeeze the movable cover in parallel until the size is recorded before disassembly.

4.6.The final hydraulic operation test (generally the on-line test is completed when there is no leakage).



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