Oil gas organic heat carrier furnace

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Installation and operation instruction

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Special note

1. Before the installation of gas-fired boilers, relevant units should determine safe and reliable gas supply methods in accordance with national standards or industry standards such as GB50028 "Urban Gas Design Code", and the pressure vessels, pressure pipelines and gas cylinders used in the gas supply system should meet the requirements of relevant technical specifications and standards for special equipment.

2. Burner configuration must meet the technical requirements of burner configuration specified in the factory materials of the boiler.

3. Burners should meet the requirements of safety technical specifications and standards such as TSG G0001-2012 "Boiler Safety Technical Supervision Regulations", and oil and gas burners should pass the type test.

4. The boiler user shall not alter or align the burner operation control program without permission.

5. Boiler operators shall, in accordance with the requirements of relevant safety technical specifications for boilers, carry out daily inspection of burners, boiler safety accessories and safety interlocking devices.

6. When the burner needs to be repaired, the boiler operator shall ask the burner manufacturing unit or authorized unit to carry out maintenance.

7. After the installation of newly installed boilers, the system commissioning shall be jointly completed by the boiler user and the installation unit or the boiler manufacturing enterprise, and the commissioning shall be carried out by the boiler operators with corresponding qualifications.

8. When the newly installed boiler needs to debug the burner, the technical personnel of the burner manufacturing unit or its authorized unit should give on-site guidance.

9. During the commissioning of the boiler system and burner, the safety management agency of the boiler operator shall ensure that no irrelevant personnel are allowed to gather near the boiler.

10. The modification or replacement of boiler burners shall be performed in accordance with the relevant construction notification procedures of boiler repair. The modification, replacement and commissioning of boiler burners shall be carried out by the burner manufacturer or its authorized unit, and the boiler use unit shall cooperate with the work; After the modification or replacement of the burner is completed, the user shall conduct self-inspection of safety accessories such as boiler safety valve, safety interlock protection device and form self-inspection records.

11. Any modification, repair and replacement of the burner shall not reduce the safety performance and energy efficiency indicators of the boiler and shall meet the environmental requirements.

12. Please read the attached technical data carefully before commissioning and igniting the boiler and burner, and work strictly in accordance with the operating procedures.

13. When the burner is in operation, abnormal movement, abnormal sound or other abnormal working state should be stopped in time to find out the cause and continue to use after troubleshooting.

14. The boiler unit using the boiler to use a month to run at least once monthly inspection, and shall record check, monthly check content mainly for boiler pressure parts and accessories and instrumentation, safety interlocks protection devices are in good condition, boiler use safety and energy saving management system is effective implementation, homework personnel whether certificate within the period of validity, Whether regular inspection is carried out according to the regulations, whether the water (medium) quality is analyzed, whether the sewage discharge is adjusted according to the change of water vapor quality, whether the water seal pipe is blocked, and other conditions.

Directory

I、Install the instructions

I、An overview of the

This specification is applicable to YY(Q)W-120Y (Q) to YY(Q)W-7000Y (Q) oil and gas organic heat carrier furnace of the company, YY(Q)W-××Y (Q) organic heat carrier furnace, Y stands for liquid phase organic heat carrier, Y(Q) stands for oil (or gas) burner, W stands for horizontal structure, ×× stands for thermal power, Y(Q) indicates that the applicable fuel is oil (or gas).

Organic heat carrier furnace (furnace) is a new type of heating equipment, with coal, oil and gas as fuel and flue gas as heat source, heat conduction oil as heat carrier through the circulating pump of forced heat transfer medium liquid circulation, to transfer heat to heat equipment, after return furnace reheated high temperature, low pressure, energy-saving equipment, heating temperature can be as high as 340 ℃, And generally under the working pressure of 1.0MPa, because the work in the liquid state, safe and reliable.

The installation and use of boilers should comply with TSG G0001-2012 Boiler Safety Technology Supervision Regulations, GB/T17410-2008 Organic Heat Carrier Furnace, GB50273-2009 Boiler Installation Engineering Construction and Acceptance Code, GB13271-2014 Boiler Air Pollutant Discharge Standard, TSG Requirements of G0002-2010 "Regulations for supervision and Management of Boiler Energy-saving Technology". When the total injection amount of liquid phase organic heat carrier in the boiler and system is greater than 5m³, safety protection devices should be installed according to the requirements of 11.3.6.2 ~ 11.4.2 in TSG G0001-2012 Boiler Safety Technical Supervision Regulations.

Boiler room system design, on the premise of ensuring safety performance, fully improve the efficiency of energy use, reduce water, electricity, self-use heat and other consumption, promote heat recovery and cascade use. Boiler room equipment layout should be as far as possible to reduce the length of pipes, smoke duct and the number of elbows, in order to reduce flow resistance. Boiler furnace wall, smoke duct, all kinds of thermal equipment, heating pipes and valves shall have good sealing and heat preservation performance, when the ambient temperature is 25 ℃, is apart from the outside of the furnace door (hole) 300 mm outer surface temperature shall not exceed 50 ℃, top shall not exceed 70 ℃, the surface temperature of thermal equipment, heating pipes and valves shall not exceed 50 ℃. The selection of boiler medium parameters should meet the requirements of use, should not make the rated outlet pressure and temperature of the boiler and the use of pressure and temperature difference is too large.

II、Product features and specifications

a、Product features

1, reasonable structure, advanced technology, small footprint, small size, beautiful appearance, simple management, high thermal efficiency, with significant energy saving effect and economic benefits, compared with similar foreign products, unique structure. The furnace type is vertical and horizontal.
2. Reasonable layout of heating surface and long service life of heat conduction oil. The flue gas emission meets the requirements of national environmental protection standard GB13271-2014 boiler Atmospheric Pollution Emission Standard.
3, the temperature adjustment is accurate and reliable, with complete operation control and safety monitoring device, high degree of automation, low labor intensity;**With export oil temperature over temperature alarm, pressure difference alarm function; If the total injection amount of organic heat carrier in the boiler system is greater than 5m³, it also has the functions of overpressure, low pressure and low flow alarm of outlet oil pressure, high and low level alarm of expansion tank, overtemperature alarm of exhaust temperature, and corresponding interlocking. (During the normal operation of the system, the stoker should check the safety alarm devices manually regularly, and the boiler should not be out of use when it is in normal operation)**

III、Range of application

Organic heat carrier furnaces have the characteristics of high heating temperature, low working pressure and energy saving, and can be widely used in various industrial heating processes. Instead of electricity, steam and other heating, improve productivity.
(1), petrochemical industry: polymerization, melting, condensation, distillation, removal of H2, forced insulation.
(2) Oil industry: fatty acid distillation, oil decomposition, concentration, esterification, vacuum deodorization.
(3), synthetic fiber industry: polymerization, melting, spinning, extension, drying.
(4), textile printing and dyeing industry: hot setting, hot melt dyeing, baking, calendering, drying, hot air stretching.
(5), plastic and rubber industry: hot pressing, hot rolling, extrusion, vulcanization molding, calendering, jet injection machine, glue mixer, conveyor belt dryer.
(6), paper industry: drying, corrugated paper processing, calender, gluing roller.
(7) Wood industry: multi-laminated board, density board hot pressing, wood drying, steam equipment.
(8), building materials industry: gypsum board drying, asphalt heating, asphalt concrete, emulsified asphalt, concrete member maintenance, drying equipment, linoleum production line.
(9), machinery industry: painting printing drying, assembly processing, cleaning and drying.
(10), food industry: baking bread, drying biscuits, cooking pot, autoclave, conveyor

belt dryer.
(11), air conditioning industry: industrial plants and civil building heating.
(12), electrical equipment industry: calender, plate press, vacuum pot, dryer.
(13) coking industry: gas storage tank, mixing station, distribution station.
(14), metal and casting industry: degreasing pool, phosphate treatment equipment, baking machine (room), sand core drying.
(15), detergent industry: cooking pot, autoclave, conveyor belt dryer, fat decomposition equipment, distillation tower.
(16), fat and paint industry: autoclave, dryer, distillation tank, cooking equipment.
(17), automobile industry: tunnel drying room, degreasing bath, phosphate treatment equipment.
(18), carbon industry: graphite electrode, carbon products, asphalt melting, kneading pot heating, extrusion molding.

IV、Product composition and process flow

a、The component of product

The heating furnace consists of a combustion system, a heating system and an electrical system. Our factory supplies the main engine and auxiliary engine of reheating furnace as well as related technical documents for customers.
(1) Combustion system:
Fuel oil (gas) furnace includes: oil storage (gas) tank, burner, combustion chamber, air preheater, chimney, etc.
(2) the heating system includes: furnace body, oil storage tank, expansion tank, circulating pump (two of which one standby), oil injection pump, filter, oil and gas separator, etc.
(3), the electrical system includes: electrical controller and its detection instrument.
(4) Technical documents: installation and operation manual, strength calculation summary table, product quality certificate, product factory list, general drawing, body diagram, monitoring instrument installation diagram, organic heat carrier furnace heating process diagram, organic heat carrier furnace foundation diagram.

b、Device Functions

（1）、Thermal equipment

With the needs of the heated material of thermal equipment temperature, determines the working temperature of the heat conduction oil, thermal oil temperature is higher than the temperature of the heated material, the temperature difference, the greater the need of heating area is smaller, large temperature difference must give the thermal oil temperature is high, and some chemical materials prone to cracking at high temperatures, coking, therefore, chooses temperature difference size shall be determined according to the specific situation, In order to avoid the heat conduction oil exceeding the maximum

operating temperature, or damage to the material to be heated.

（2）、Organic heat carrier furnace

Organic heat carrier furnace is the key equipment of heating system. In order to avoid over-temperature coking, the flow rate of heat conduction oil in the furnace tube should not be too low, but too high flow rate will increase the flow resistance, more consumption of circulating pump head and power.

Organic heat carrier furnace exhaust temperature is higher, generally in 300-400℃ larger furnace type should add air preheater or energy saver, in order to improve thermal efficiency and save energy consumption.

（3）、 Circulating oil pump

This system uses RY series hot oil circulating pump, reliable seal, no leakage, is the power of forced circulation of thermal oil furnace. Each hot oil furnace is required to be equipped with two hot oil circulating pumps (the models of circulating pumps in the general drawings are for reference only).

（4）、Expansion groove (high slot)

Expansion tank is used to compensate the volume change of heat conduction oil due to temperature change, so as to stabilize the pressure of heat conduction oil in the system. At the same time, it can also help the system dehydrate and exhaust steam. Therefore, expansion grooves should be set 3 meters above the system equipment or pipe elevation.

When the system is an open system, the expansion tank is a atmospheric pressure vessel, which is provided with an air vent, an overflow port and a low level alarm device to ensure the safety of the system.

When the system is a closed system, the expansion tank is a pressure vessel, which is sealed by nitrogen with the highest working pressure of 0.08mpa. It is equipped with a safety valve, a pressure gauge, a liquid level gauge, and has the functions of high and low liquid level alarm and overpressure alarm.

The stock control of thermal oil in the expansion tank should be: when the system is at room temperature, only 1/3 of the volume of the filling degree; And when the system is at operating temperature, it is 2/3 full volume.

High liquid level should be maintained during normal operation. In case of sudden power failure or oil pump failure and emergency furnace shutdown, the cold oil replacement valve can be opened. At this time, the cold oil in the high tank drains through the furnace tube with its potential energy into the oil storage tank, so as to prevent the furnace tube and heat conduction oil from overheating.

（5）、Oil storage tank (low tank)

The oil storage tank is mainly used to store the thermal oil discharged from expansion tank, furnace tube and system. Normal operation should be in a low level state, ready to accept external thermal oil. Exhaust ports (air vents) should be connected to the safety zone, and no valves should be set.**When the amount of organic heat carrier injected into the system is greater than 10m3 at a time, a**

closed circulation system should be adopted, generally with nitrogen seal (see heating process system diagram for details). The nitrogen sealing system should be put into use after the organic heat carrier in the boiler system is dehydrated and delighted. The nitrogen sealing system automatically exhausts when the pressure of the expansion tank is higher than 0.06mpa and automatically takes in air when the pressure is lower than 0.01mpa. The specific adjustment can be made according to the actual situation of the system. Do not install the solenoid valve at the nitrogen outlet directly on the oil storage tank. Connect a cooling pipe larger than 300mm before installing the solenoid valve to prevent damage to the solenoid valve by high temperature. The maximum working pressure of expansion tank and oil storage tank is 0.08mpa, and the setting pressure of safety valve on it is 0.09mpa. Users of nitrogen supply system should take care of themselves, and the intake pressure is required to be 0.6mpa.

（6）、 Injection pump

The oil injection pump is used for oil supply, generally using cold oil gear pump.

（7）、 Oil filter

Oil filter is used to filter and remove foreign matter and coking in the system. Generally, wire mesh is used for coarse filtering. In order to improve the service life of thermal oil and organic heat carrier furnace, stainless steel powder metallurgy filter can be used as fine filter device.

（8）、 Oil and gas separator

It is used to separate air, steam and non-condensable gas in the system, and to discharge it into the expansion tank. The height of the installation, the level of the inlet and outlet at least flush with the highest point of the pipeline.

（9）、safety valve

The safety valve should be arranged on the outlet pipeline of the organic heat carrier furnace, the discharge port is connected with the oil storage tank, and the valve shall not be set between the furnace body, mainly to prevent the heat conduction oil heating overpressure caused by the misoperation of the valve. The setting pressure of the safety valve at the boiler outlet is 1.1 times of the rated working pressure of the boiler, generally 0.88mpa. **(See the heating process system diagram for details)**

（10）、Combustion system auxiliary

Please refer to the corresponding operation manual.

c、The process flow

Organic heat carrier furnace heating system, according to the actual situation can be designed different process. This process consists of:

(1) Oil injection: heat conduction oil is injected into the system, and the oil source is provided by external or oil storage tank.

(2) Main cycle: the heat carrier heating oil furnace obtains heat energy and then

supplies heat to the hot equipment, which is composed of circulating oil pump, hot oil furnace, hot equipment, oil and gas separator, filter and its connecting pipeline and valve.

(3) Cold oil replacement: In order to prevent heat conduction oil in the furnace tube from overheating, close the system valve and open the replacement valve when the emergency furnace is stopped. The hot oil in the oil furnace is replaced into the oil storage tank by the expansion tank, oil and gas separator, oil furnace and its connecting pipeline.

(4) The excess oil of overflow, exhaust and expansion tank automatically flows into the oil storage tank and expansion tank through the overflow pipe, and the gas of the oil storage tank is passed to the safe area by the drainage pipe respectively.

⑸ Display of temperature, pressure and differential pressure. Represents the circulation of heat conduction oil in the system, reflecting the normal working condition of the heating system.

⑹, auxiliary exhaust steam: when the heat conduction oil initial dehydration stage, gas is more, the auxiliary exhaust valve and pipeline can be auxiliary exhaust, at this time should be closed on the expansion tank drain pipe valve, so as not to heat conduction oil is washed away by gas, from the drain pipe ejector. When the heating furnace is working normally, close the auxiliary valve and open the empty pipe valve. The trace gas generated in the system is discharged through the oil and gas separator through the exhaust pipe.

Bypass: opens the bypass valve for bypass circulation when stopping heating the hot-using equipment. When the bypass valve is closed in normal operation, the expansion tube plays the role of thermal expansion overflow and automatic compensation of thermal oil;

When the total amount of organic heat carrier injected into the boiler and system is more than 5m3, the safety protection device shall be installed according to the requirements of Article 11.3.6.2~11.3.6.6 of the Boiler Safety Technology Supervision Regulations.

1. The furnace of the flame heating furnace is equipped with an inert gas fire extinguishing system, which is generally nitrogen. The gas supply system is provided by the user, and the intake pressure is required to be 0.6mpa.

2, the boiler has export oil temperature over temperature alarm, pressure difference alarm function; If the total injection amount of the organic heat carrier in the boiler system is greater than 5m³, it also has the functions of overpressure, low pressure and low flow alarm of outlet oil pressure, alarm of high and low liquid level of the expansion tank, alarm of exhaust temperature over temperature, and corresponding interlocking. (During the normal operation of the system, the stoker should check the safety alarm device manually regularly, and the boiler should not be out of use during the normal operation). The closed expansion tank should also be equipped with an overpressure alarm device. Alarm and interlock with heating device, timely cut off the heating device.

V、Installation work

1.After the boiler is transported to the site, the following preparations must be made before installation in order to be put into operation as soon as possible:

Boiler installation must be done by a unit with the appropriate level of installation license.

Boiler installation should be to the current market supervision and management department for "special equipment installation, renovation and maintenance notification" before the installation and construction.

2.Organize relevant personnel to learn technical information

Organize relevant personnel to learn, be familiar with and comply with TSG G0001-2012 "Boiler Safety Technical Supervision Regulations", boiler drawings, "Installation and Operation Instructions" and other documents, so as to understand and master the installation, lifting operation and other regulations and matters needing attention.

3. Determining the installation site

(1) the installation site should be close to the hot site to shorten the conveying pipeline, reduce the heat loss of the pipeline and reduce the cost.

(2) Convenient storage and transportation of fuel and ash.

(3) Convenient installation and transportation of boilers.

(4), boiler room should conform to GB50041 "boiler room design code" boiler room provisions, requirements have enough height, sufficient light and good ventilation, the ground is not water.

Boiler room should have effective ventilation and fire fighting measures.

4. Check unloading and other work

(1) After the boiler arrives, check the parts according to the manufacturer's delivery list, check the boiler installation drawing, check its integrity, and check whether the boiler body is damaged or deformed during transportation.

(2) the boiler body should pay attention to the position of the wire rope when unloading and lifting with a crane to avoid damage to the boiler body and shell and other parts. Check lifting equipment capacity and lifting position:

1, lifting equipment capacity: see furnace body weight.

2. Lifting position: lifting lug of furnace body.

5.Equipment layout Requirements

(1) Equipment layout should be convenient for operation, access and maintenance.

(2) The bottom of the expansion groove shall be at least 3m higher than the top of the furnace, and shall not be placed directly above the furnace, and the volume of the expansion groove shall not be less than 1.3 times of the expansion volume of the system.

(3) The oil storage tank should be located at the lowest place of the system and must be separated from the hot oil furnace with a partition wall. The oil storage tank volume is not less than 1.2 times the total oil volume of the system.

(4) The electric control cabinet should be set in a place without radiation, and should

be facing the operator, easy to observe and maintain.
(5) Other equipment can refer to the process Flow Chart provided at random according to the specific situation.

6.Equipment Installation Requirements

(1) Foundation preparation: foundation construction, according to the equipment foundation map provided by the factory, according to the local soil conditions and needs to determine the foundation elevation, depth and label.
(2) After the equipment is in place, water the anchor bolts, align and level them, and then tighten the anchor bolts.

7.Pipeline layout requirements in accordance with GB/T17410-2008 "Organic Heat Carrier furnace" relevant provisions

Shown in table a

Rated power /kW	Expansion tube and overflow tube DN/mm	Expansion tube and overflow tube DN/mm
≤600	25	32
＞600~900	32	40
＞900~1200	40	50
＞1200~2400	50	65
＞2400~6000	65	80
＞6000~12000	80	100
＞12000~24000	100	150

The pipe diameter shall be reasonably determined according to the specific conditions of the equipment and the head of the pump.
(1) the pipe must be made of seamless steel pipe, the connection is welded or flanged, the valve fittings must be greater than or equal to 1.6mpa level, and shall not use cast iron and non-ferrous metals, the pipe fittings must be removed before installation of sundry impurities.
(2) When the pipeline is installed, a safety valve should be installed on the main outlet of the circulating oil pump and connected to the oil storage tank to ensure the reliable pressure relief and safe operation of the hot oil furnace.
(3) The expansion tube connected between the oil and gas separator and the expansion groove is strictly prohibited to install valves and shall not be insulated.
(4) the diameter of the exhaust pipe of the expansion tank and oil storage tank should be a grade larger than the specified value of the expansion pipe. Valves should not be installed above and below the exhaust pipe, and rainproof elbows should be added.
(5) Exhaust valves and exhaust valves should be set at the highest and lowest places of the system.
(6) The slope of pipeline installation should be 2‰-3‰.

(7) The pipeline shall be set up reasonably, and thermal compensation measures shall be taken for the pipeline.

(8) The sealing material for the pipe flange connection shall be metal wound graphite gasket or expanded composite graphite gasket.

(9) no valve shall be installed on the expansion pipe and overflow pipe.

(10) All equipment shall not bear the weight of the pipeline, and hot oil expansion compensation shall be considered for hot oil pipelines of straight sections greater than 30m.

(11) Pipe flanges should be selected with protruding or concave and convex face flat welding flanges (forgings) with neck with nominal pressure not less than 1.6mpa. The recommended standard for flanges is HG/T20592-2009 "Steel Pipe Flanges", and the standard for forgings IS NB/T47008-2010 "Carbon Steel and alloy Steel Forgings for Pressure Equipment".

8.Installation of burner for oil gas organic heat carrier furnace

The burners that meet the national safety standards and pass the type test should be selected; Fix the burner on the interface flange of the furnace body.

(1) Installation of fuel system

A. Connect the supply and return oil pipe. Pay attention to the loose connection of the oil pipe, do not pull it too tight, and ensure that the rotation of the burner is not affected, as well as the front door is not affected.

B. Installation of filters

A filter should be installed in front of the oil pump, and the oil circuit system should realize at least two filtration (see burner manual and attached drawings for details).

C. Fuel system installation

According to the boiler room layout drawings, install the fuel system in place and connect the pipelines.

D. Filling the gap between the built-in protective cover and the outer insulation layer of the burner

According to the type of burner selected by users, the gap between the built-in protective cover and the outer insulation layer should be filled with aluminum silicate fiber castable or aluminum silicate fiber rope, requiring no gap, to prevent high temperature flue gas radiation burner flange and other parts.

E. The oil supply system shall comply with the relevant safety technical specifications and standards.

(2) Gas system installation

A, according to the nature of the gas to choose the appropriate gas pipeline, gas accessories pipeline should be calibrated with the maximum interface pressure of the burner, the gas supply pipeline must be at least one larger than the burner accessories pipeline.

B. Gas pipelines must be tested for airtightness (see burner instructions for details).

C, the gas pressure regulating valve can only be loaded into the horizontal gas pipeline, and the pressure regulating valve should be installed on the ventilation port of a air outlet pipe, air outlet pipe interface size see "Burner Manual".

D. Install gas meter according to the requirements of gas management agency;
E, the filling of the gap between the built-in protective cover and the outer insulation layer of the burner;
F. The gas supply system shall comply with the relevant safety technical specifications and standards.
According to the type of burner selected by users, the gap between the built-in protective cover and the outer insulation layer should be filled with aluminum silicate fiber castable or aluminum silicate fiber rope, requiring no gap, to prevent high temperature flue gas radiation burner flange and other parts.

9. Installation of monitoring meters

For the installation of monitoring instruments, refer to the factory technical document "Valve Instrument Diagram", and meet the requirements of 11.3.6.2 ~ 11.3.6.6 for organic heat carrier furnace in TSG G0001-2012 "Boiler Safety Technical Supervision Regulations" : For example, the flowmeter is installed at the inlet and outlet of the oil to measure the circulating flow, the inlet and outlet of the oil is provided with a thermometer and a pressure gauge, and the tail is provided with industrial bimetal thermometer, smoke exhaust temperature and other measuring points.
(1) Pressure gauge: the pressure gauge is connected with the liquid storage elbow, and the globe valve or needle valve should be installed above the liquid storage elbow; The limit value of the dial dial of the pressure gauge should be 1.5 times to 3 times of the working pressure, and the best is 2 times; The accuracy of the pressure gauge is not less than 2.5 and the dial diameter is not less than 100mm.
(2) Liquid level meter: the liquid level meter should not use glass tube type liquid level meter; The drain pipe of the liquid level gauge must be connected to the storage pipe, and the drain pipe should be equipped with a drain cock. When running, the drain cock must be in closed state.
(3) Flowmeter: the flowmeter should adopt high temperature resistant flowmeter, and should have the function of indicating, calculating and recording.
(4) safety valve: the material of the relief valve body should be made of high temperature resistant material, and the discharge port of the safety valve should be connected to a safe place for discharge.
(5) Temperature display instrument: heat conduction oil inlet and outlet according to the heating process flow chart installation temperature display instrument.

VI\System purge and pressure test

a、Purging system

After the system is installed, it should be cleaned with compressed air in sections to remove welding slag and foreign matter inside.

b、Pressure test

1. After the purge of the whole system is completed, connect the pipeline, check and confirm the result, and then carry out the pressure test.
2, the test pressure adopts hydraulic test, in accordance with TSG G0001-2012 "Boiler Safety Technology Supervision Regulations" 11.2.7 provisions, the test pressure first rise to 1.5 times the working pressure, holding pressure for 20 minutes, and then reduce the pressure to the working pressure for inspection, the inspection pressure remains unchanged.
Please refer to the general drawing of the boiler or the boiler body drawing for the water pressure test of this boiler
3, pressure test, expansion tank, oil storage tank does not carry out pressure test, need to be sealed with blind plate.
4. After the system pressure test confirms that there is no leakage, remove the blind plate and connect with the pipeline system to ensure the smooth pipeline of the system.

VII、Pipe insulation

If the heat conduction oil pipe skin is not insulated, the heat dissipation per square at 280℃ is about 14600~21000kJ. Pipe insulation can refer to the following table:

The pipe diameter	With hot temperature	200℃	250℃	300℃	340℃
	Rock wool				
38mm~76mm	Insulation thickness	50mm	60mm	70mm	80mm
89mm~219mm		70mm	80mm	80mm	80mm

VIII、Selection of thermal oil

The working medium of organic heat carrier furnace is organic heat carrier, commonly known as heat conduction oil. It is a combustible item. It can spontaneously ignite when the temperature reaches the flash point. Therefore, the quality of heat conduction oil is directly related to the normal operation of organic heat carrier furnace. Great attention must be paid to it.

a 、 Determination of allowable temperature (grade) of thermal oil

Heat conduction oil is strictly prohibited to use over temperature, so the allowable temperature (grade) of heat conduction oil should be higher than the process temperature needed to be used. T≥T1+ δ T+C (℃)
Where: T - the permitted operating temperature of the thermal oil.
T1 - Maximum operating temperature of heat conduction oil required by the thermal equipment: determined by the user according to the requirements of the thermal equipment.
δ T -- The difference between the outlet temperature of carrier furnace medium and the inlet temperature of thermal equipment medium: determined by the length of heating pipeline and the insulation effect of pipeline.
C - reserve factor: considering the long-term use of the medium and quality changes to leave room, generally take about 30 ~ 50℃.

b、Determination of thermal oil requirement

The determination of the minimum amount of heat conduction oil is calculated according to the following formula:
Q = 1.2 (A + B + C + D)
Where: Q- the minimum amount of heat conduction oil required
A- The oil content of the furnace
B- Oil capacity of hot equipment
C- Oil capacity of heating pipeline
D- Oil required for the lowest level of the high expansion tank

c、Performance requirements for thermal conductivity oil

The thermal conductivity oil should have: good thermal stability, moderate density, small viscosity, high specific heat, high distillation range and flash point, low acid value and residual carbon content, no impurities, strong oxidation resistance, long life and other characteristics.

d、Use and sampling analysis of heat conduction oil

Heat conduction oil must be dehydrated before use. Thermal conduction oil of different varieties, grades, categories and manufacturing units is not easy to be mixed. When mixing is needed, the mixing conditions and requirements provided by the original thermal oil manufacturer should be followed before mixing.
Heat conduction oil used at high temperature for a long time, its quality will change slowly, if it is under the condition of overtemperature run quickly of quality deterioration, so using the heat conduction oil a year deal with the carbon residue, acid value, viscosity and flash point sampling analysis, when there are two analysis unqualified or oil heat decomposition components content of more than 10%, should

be replaced or regenerated.
Carbon residue value (measured according to GB268c SH/T0170 GB/T17144) < 1.0%, when > 1.5%, should be recycled, otherwise should not continue to use.
Acid value (measured by GB24747-2009) < 0.5mg/g, when > 1.5mg/g, should stop using.
Movement viscosity (40℃) (measured by GB/T265 GB/T11137b) < 40mm2/s, when > 60mm2/s, should not continue to use.
Flash point (closed) (measured according to GB261) ≥100℃, when ≤60℃, should stop using.
The use of heat conduction oil should also be carried out in accordance with the provisions and requirements of the operation manual of heat conduction oil.
The selection of heat conduction oil has a great influence on the safety, life and performance of hot oil furnace system. There are many kinds of heat conduction oil produced in China, and each kind of heat conduction oil has its use temperature range, and it is never allowed to use over temperature. When heating the material in the hot oil furnace, there must be a certain temperature difference between the heat conduction oil and the material to be heated, and the maximum temperature of the heat conduction oil shall not exceed its maximum allowable operating temperature. Therefore, when selecting the heat conduction oil, the maximum allowable operating temperature should be appropriately higher than the actual maximum operating temperature. **Based on my experience,The maximum allowable operating temperature of heat conduction oil should be 20-50℃ higher than the actual operating temperature.**

II、Directions for use

Liquid level, pressure, flow, temperature alarm, interlocking device failure, may lead to boiler explosion, and can not exit!! (Alarm, interlock protection device is damaged, should be repaired in time, the boiler can run normally after repair)

I、Commissioning preparations

1, operators must be trained and assessed by the state market supervision and administration department before they can work.
2, the new heat conduction oil system before the use of heat conduction oil, with TY - 1 heat conduction oil cleaning agent to clean the rust in the furnace, and remove impurities and moisture; When the used heat conduction oil furnace system is overhauled or replaced with new oil, the oil scale and carbon residue in the furnace are cleaned with cleaning agent.
3. Open the oil inlet valve, close the oil discharge valve and the system oil discharge valve. Start the injection pump to inject oil into the expansion tank, open the valve of the whole system at the same time, start the circulating oil pump and close the oil pump when the overflow pipe overflows.
4, cold operation should be between 4 ~ 8 hours, preliminary discharge of air in the

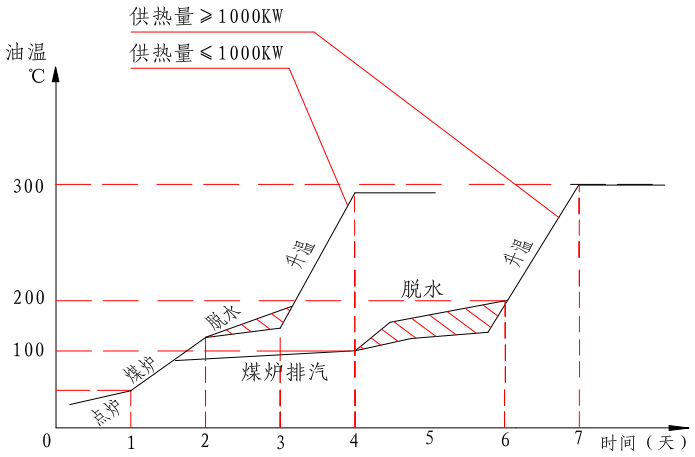
system, to be the circulation pump outlet pressure stability, can be ignited into the oven state.

II、Oven

Whether new furnace, modified furnace, overhaul furnace, long-term use of organic heat carrier furnace, such as no oven, because the furnace wall contains water, such as ignition heating too fast, water rapid evaporation and expansion, resulting in the furnace wall furnace arch cracking or collapse.

Before the oven, it is necessary to check whether the auxiliary machine is normal, whether the lubrication of the transmission equipment is good, whether the oil and gas supply system of the oil furnace is normal, and whether the electrical system connection is correct and reliable.

The oven generally needs 3 ~ 7 days, small heating furnace can be shorter, large heating furnace can be larger, the furnace temperature first ignition should not be too high, between 150℃ ~ 350℃ is appropriate, after the removal of water in the furnace can be combined with heat conduction oil dehydration at the same time, can refer to the temperature rise curve. (See picture below)



95℃ - 130℃ range is to drive the residual water in the system stage in this stage of the heating speed should not be too fast, the general temperature should be controlled in the range of 4℃----6℃/h, when the displacement is larger and the circulation pump has the phenomenon of pumping, current and pump pressure is not stable, the bottom of the expansion tank or circulation pipe water sound should be maintained at a constant temperature, do not try to speed up the process, Otherwise, it will be dangerous to damage the equipment in case of sudden boiling. It is not possible to continue heating until the pump pressure is stable. Over 130℃----280℃ into the stage of removing light components of heat conduction oil, the heating speed should not be too fast, should be controlled in the range of 5℃--10℃/h, the pump pressure is normal when the heating speed can be faster, the pump pressure is not normal when the speed should slow down.

III、operation

a、The relief valve

The safety valve shall be adjusted at the time of the initial fire: the adjustment shall be made to the pressure specified in Table 6-4 of the Boiler Safety Technical Supervision Code TSG G0001-2012, and shall be checked at least once a year in accordance with Article 6.1.15.

Table 6-4 Safety valve setting pressure

1.10 times the working pressure but not less than + 0.07mpa
1.12 times the working pressure but not less than the working pressure + 0.10mpa

The setting pressure value of each furnace type can be seen in the schematic diagram of heating process of organic heat carrier furnace

Safety valve should be adjusted by professional boiler inspection department. All safety valves shall not unseal and adjust themselves after calibration.

When the heating furnace is in operation, the safety valve should be tested manually regularly. When the heating furnace is stopped and started again, the safety valve should also be manually discharged regularly. **Do not tap on any part of the relief valve and open the relief valve only with its lever.**

b、Oil injection and overflow

When the amount of oil in the system is insufficient, the level switch of the expansion tank will issue a low level alarm through the control cabinet, and then the oil injection pump can be started for oil injection. When the expansion tank reaches the high liquid level, the liquid level switch automatically stops filling oil. When the expansion volume of thermal oil in the system increases, it is automatically discharged into the oil storage tank through the overflow pipe of the expansion tank.

c、heat conduction oil circulation

During the working process of the system, the circulating pump should not be stopped. If one circulating pump fails, the inlet and outlet valves of another circulating pump should be opened immediately and fully opened. The other circulating pump should be started after the inlet and outlet valves of the original pump are closed.

d、Bypass circulation

If the heat is stopped by the hot equipment or the system fails, the bypass valve can be opened to close the main valve, and the bypass pipe is circulated.

e、 temperature regulation

Set upper and lower limits according to the operating temperature. An instrument to measure the exhaust temperature is installed at the tail of the thermal oil furnace. When the oil temperature rise to the upper limit, automatically close the

drum induced draft fan, such as flue waste heat furnace should open the bypass flue, the temperature drops to the lower limit can automatically start the induced draft fan, blower, oil (gas) furnace automatically adjust the oil (gas) valve, flue waste heat furnace should close the bypass flue.

f、 Pressure difference adjustment

Adjust the setting range of the differential pressure meter according to the differential pressure value during normal operation after starting. Make it alarm at 0.05 ~ 0.1mpa above the normal value (refer to the flow chart of heating system for specific differential pressure alarm value).

g、Adjust the burner of oil and gas organic heat carrier furnace

A. System commissioning shall be completed jointly by the boiler user and the boiler installation unit or the boiler manufacturing enterprise;
B. During commissioning, boiler operators with corresponding qualifications shall operate the boiler, and the technical personnel of the burner manufacturing unit or its authorized unit shall provide on-site guidance;
C. During the commissioning of the boiler system and burner, the safety management agency of the boiler user shall ensure that no irrelevant personnel are allowed to gather near the boiler.

(1) Adjustment of fuel burner

A, the combustion equipment and electrical equipment should be carefully checked before ignition, all pipes must be sealed, all pipes must be tested before the burner is tested, the fuel pipe should be tested in accordance with national standards, air leakage is not allowed.
B. Start the burner under the cyclic running state of heat conduction oil and control the ignition program. The first is to blow the scavenging time is not less than 10 minutes (the total ventilation volume of the purge should not be less than three times the total volume from the furnace to the chimney inlet flue), in order to blow the remaining oil and gas in the furnace, to prevent the ignition explosion. After scavenge time point small fire, after the set time and then open the fire, the boiler will burn normally. If the first ignition does not occur, the fuel supply should be cut off immediately, and then the ignition can be re-purged.
C. After normal combustion, adjust the oil pressure according to the requirements of the manual.
D, adjust the position of the damper to see the black smoke.
E. If there is a fire extinguishing signal, the flame monitoring device will issue a command from the controller after detection, immediately cut off the fuel valve, and reignite according to the ignition control program after troubleshooting.
F. The flame monitoring device should be checked frequently to ensure the normal operation of the equipment.

(2) Gas burner adjustment

A, before ignition should be carefully checked combustion equipment and electrical equipment, all pipes must be sealed, all pipes must be tested before the burner is tested, gas pipeline to be in accordance with national standards for pressure test, do not allow leakage.

B. Start the burner under the cyclic running state of heat conduction oil and control the ignition program. First of all, the blowing time is not less than 10 minutes (the total ventilation volume of the purge should not be less than three times the total volume of the flue from the furnace to the chimney entrance), in order to blow the remaining gas in the furnace, to prevent the explosion during the ignition. After scavenge time point small fire, after the set time and then open the fire, the boiler will burn normally. If the first ignition does not occur, the fuel supply should be cut off immediately, and then the ignition can be re-purged.

C. After normal combustion, adjust the gas pressure according to the requirements of the burner manual;

D, adjust the air distribution to see the black smoke.

E. If there is a fire extinguishing signal, the flame monitoring device will issue a command from the controller after detection, immediately cut off the fuel valve, and reignite according to the ignition control program after troubleshooting.

F. The flame monitoring device should be checked frequently to ensure the normal operation of the equipment.

h、Burner use management

A. Burners that meet the national safety standards and pass the type test should be selected;

B. The boiler user shall not alter or align the burner operation control program without permission;

C. The boiler user shall carry out daily inspection of burners, boiler safety accessories and safety interlocking devices in accordance with the requirements of relevant safety technical specifications for boilers;

D, the need to repair the burner, the boiler should be used by the manufacturer of the burner or its authorized unit.

IV、The furnace

1. Stop the furnace normally

First stop the burner, the hot oil pump circulation normal operation, until the furnace temperature drops below 100℃, the whole system can stop operation.

2, emergency stop furnace

When the power failure or oil pump failure should be emergency stop furnace, at this time because the furnace temperature is very high, furnace tube heat conduction oil temperature will rise sharply, exceeding the allowable value in a very short time, then to make a large number of cold air into the furnace, accelerate cooling; Open the cold oil replacement valve quickly. The cold oil in the expansion tank passes

through the oil and gas separator and the furnace tube is put into the oil storage tank to avoid coking of the heat conduction oil; Close the oil (gas) inlet valve of fuel (gas) heating furnace; Close the inlet valve of the hot oil pump and slowly open the discharge valve of the hot oil pump to make the hot oil enter the oil storage tank.

V、Operation matters needing attention

1, organic heat carrier must be used after dehydration. Different organic heat carriers are not suitable for mixed use. Before mixed use, the organic heat carrier production unit should provide mixed conditions and requirements to confirm the safety and reliability before use.
2. When the pressure difference is unstable, it shall not be put into use.
3. During normal operation and cooling, the hot oil pump shall not stop.
4, high temperature state, to ensure good circulation.
5. When working normally, the thermal oil in the high tank should be kept at a high level, and the thermal oil in the oil storage tank should be at a low level.
6. The oil output temperature shall not exceed the allowable working temperature of heat conduction oil.
7. Often lubricate and lubricate the machinery.
8. When the furnace is stopped in an emergency, the furnace shall not be poured with water.
9. When the furnace is normally stopped, the oil temperature should be reduced to below 100℃ before the hot oil pump is stopped.
10. The oil storage tank is connected to the safe area.
11. The first temperature rise rate must be run according to the temperature rise curve.
12, boiler room should be equipped with electrical appliances, oil fire equipment.
13. Formulate operating procedures.
14. An operating account shall be established.

VI、Maintenance and maintenance

1, the heating furnace in operation should establish a strict shift system, and carefully fill in the operation records, there should be daily, weekly, monthly inspection work system and complete records, keep files for reference.
2. Daily inspection includes: whether the hot circulation oil pump, induced draft fan and other operation is normal, whether the pointer of various electronic control instruments is correct, whether the system pipeline leaks, whether the dust is cleaned on time, etc.
3. Weekly inspection items: Whether the hot oil circulation system is short of oil? Coking? If the furnace tube coking, should immediately wash the furnace before continuing to use.
4. Monthly inspection work items: calibration of various electronic control instruments to maintain accuracy; The expansion tank is short of oil, and the expansion tank should pay attention to dehydration after adding new oil; Add

lubricating oil to each transmission part; Whether the furnace is burned, if there is to be repaired in time.

5, annual inspection items: pressure gauge should be checked once every half a year, according to the need for pressure test, pressure is 1.5 times the working pressure; After pressure boost, close the valve and stabilize the pressure for 20 minutes. The temperature of heat conduction oil is above 280℃ every six months; Tests are performed every year below 280℃.

The carbon residue, acid value, viscosity and flash point of the organic heat carrier in use should be analyzed every year. When there are two unqualified analyses or the content of the decomposed components of the heat carrier exceeds 10%, the heat conduction oil should be replaced or regenerated.

VII、Fault analysis and troubleshooting

序号	The fault phenomenon	The cause of the problem	The solution
1	Excessive temperature of boiler inlet and outlet oil (compared with original record)	1. The temperature is low 2. Heat conduction oil deteriorates 3. The system is short of oil	1. Check the burning equipment 2. Test thermal oil 3. The filling oil
2	When the heating furnace is heating up, the flow rate is unstable, the pressure gauge is bouncing, and the pump has the phenomenon of suction.	1. The heat conduction oil of the circulation system is vaporized with water or light components 2. Heat conduction oil deteriorates	1. Dehydrate and exhaust 2.Eliminate light components 3.Replace heat conduction oil
3	The heat conduction oil temperature is too high, and the heat device temperature is low	1. Coking of furnace tube 2. The hot equipment is not unobstructed and coking	1. Check whether the coil is burned 2. Clean pipes and heat equipment 3.Strictly follow the instructions
4	The oil return temperature is high	1. Check whether the instrument is out of order 2. Heat conduction oil deteriorates	1. Replace the thermometer 2. An oil change

5	The pump outlet pressure is small	1. The valve opening of circulation system is small 2. The filter is blocked 3.The pressure gauge is out of order	1. Check the valve 2. Check the filter 3. Check pressure gauge
6	The thermal oil doesn't go up in temperature	1. Whether the coal quality meets the requirements of furnace type coal 2. Whether the air supply volume is too small 3.. Excessive heat load 4. Whether coking affects ventilation 5. Check whether the air duct is blocked 6. Thermal oil failure	1. Change the coal type 2. Adjust the air supply and ventilation 3. Adjust the heat 4. Check regularly 5. Clear grey 6. Replace heat conduction oil
7	The flue gas temperature is high	1. There is much ash on the wall of furnace tube 2. Failure of furnace arch 3. The flue gas short circuit	1. Purge coil 2. Repair the furnace arch 3. Repair air leaks
8	Boiler inlet and outlet pressure changes (compared with the original record)	1. Thermal oil deteriorates 2. Whether the pipe or furnace tube is coking	1. Replace the heat conduction oil 2. Clean the boiler or piping
9	Boiler positive pressure combustion door fire	1. Whether the air supply volume is too large 2. Whether the air volume is too small 3. Check whether the air duct is blocked 4. Whether there is	1. Reduce the air supply 2. Increase air volume or smoke volume chimney section. Replace the flue layout scheme 3. Clean the smoke duct 4. Re-seal 5. Normal inventory

		tight air leakage at the joint of flue chimney and boiler 5.Whether coking affects the air volume	

VIII、Installation of energy saver and water quality requirements

The energy saver is non-pressure equipment, it is strictly prohibited to operate under pressure!!

1. Before installation, check whether the bolt holes of the inlet and outlet flange of the energy saver tube are respectively matched with the boiler and chimney pipe;

2, the energy saver smoke inlet and boiler smoke outlet, energy saver smoke outlet and chimney smoke inlet pipe bolt connection, but must add gasket in the middle.

Warning: the water quality does not meet the requirements, will cause sediment to settle the lower part of the heat exchanger and form scale, damage the water circulation, make the pipe overheating, deformation, tube burst, and even cause the energy saver crack and burn!!

The water quality requirements of the energy saver should meet the relevant provisions of 4.6 of GB/T1576-2018 "Water Quality of Industrial Boilers".

The water supply and water quality of the natural circulation steam boiler using external water treatment should meet the requirements of table 1 below, and the water quality of the natural circulation steam boiler and soda water dual-use boiler using internal dosing treatment should meet the requirements of table 2 below.

Table 1 Water quality of natural circulation steam boiler and soda boiler treated with external water

	Rated steam pressure: MPa	P≤1.0		1.0＜P≤1.6		1.6＜P≤2.5		2.5＜P＜3.8	
Distinguish between	Type of recharge water	Demineralized water	In addition to the brine	Demineralized water	In addition to the brine	Demineralized water	In addition to the brine	Demineralized water	In addition to the brine

Feed water	Turbidity FTU		≤5.0						
	Hardness mmol/L		≤0.03						≤5.0×10-3
	pH（25℃）		7.0 ～ 10.5	8.5 ～ 10.5	7.0 ～ 10.5	8.5 ～ 10.5	7.0 ～ 10.5	8.5 ～ 10.5	7.0 ～ 10.5	8.5 ～ 10.5
	Electrical conductivity（25℃） μS/cm		——	——	≤5.5×102	≤1.1×102	≤5.0×102	≤1.0×102	≤3.5×102	≤80.0
	Dissolved oxygen (do) amg/L		≤0.10			≤0.050				
	Oil mg/L		≤2.0							
	Iron mg/L		≤0.30					≤0.10		
water	Total alkalinity b mmol/L	No superheater	4.0 ～ 26.0	≤26.0	4.0 ～ 24.0	≤24.0	4.0 ～ 16.0	≤16.0	≤12.0	
		Have a superheater	——	——	≤14.0		≤12.0			
	Phenolphthalein alkalinity mmol/L	No superheater	2.0 ～ 18.0	≤18.0	2.0 ～ 16.0	≤16.0	2.0 ～ 12.0	≤12.0	≤10.0	
		Have a superheater	——	——	≤10.0					
	pH（25℃）		10.0～12.0						9.0 ～ 12.0	9.0 ～ 11.0

	Electrical conductivity （25℃） μS/cm	No superheater	≤6.4×102	≤5.6×102	≤4.8×102	≤4.0×102
		Have a superheater	——	——	≤4.8×102	≤4.0×102	≤3.2×102
	Dissolve solidsmg/L	No superheater	≤4.0×103	≤3.5×103	≤3.0×103	≤2.5×103
		Have a superheater	——	——	≤3.0×103	≤2.5×103	≤2.0×103
	Phosphoric acid root c mg/L		——	10～30		5～20
	D sulfited mg/L		——	10～30		5～10
	The relative basicitye		＜0.2			

Note 1: for boilers with a rated steam capacity of less than or equal to 4t/h and a rated steam pressure of less than or equal to 1.0Mpa, the conductivity and dissolved solids specifications can be shown in table 2.

Note 2: For the boiler with rated steam pressure less than or equal to 2.5mpa, the supplement water is desalinated, and the feed water conductivity is less than 10μS/cm, the lower limit of pH (25℃) can be controlled not less than 9.0 and the sulfate group is not less than 5 mg/L

A The oxygen content of the boiler feed water for the steam turbine should be less than or equal to 0.050mg/L.

B for boilers with low steam quality requirements and no superheater, the upper limit of total alkalinity of pot water can be appropriately relaxed, but the pH value of pot water should not exceed the upper limit after relaxation.

III、Use the management

1. The boiler user shall be responsible for the energy conservation management of boilers and their systems, and the technical personnel engaged in the energy conservation management shall have professional knowledge related to boilers and

be familiar with the relevant national laws, regulations, safety technical specifications and corresponding standards.

2.Boiler users shall establish, improve and implement relevant systems for the management of energy conservation in boilers and their systems. The energy conservation management system shall include at least the following contents:

(1) Energy saving target responsibility system and management post responsibility system;

(2) Boiler and its system daily energy saving inspection system, and in accordance with the design requirements of the correct choice of fuel;

(3) Boiler fuel admission inspection analysis and management system, and in accordance with the design requirements of the correct choice of fuel;

(4) Measuring instrument calibration and management system;

(5) Boiler and its system maintenance system;

(6) Boiler water (medium) quality treatment management system;

(7) Energy saving training and assessment system for boiler operators and water treatment operators, education, training and assessment plan of boiler economic operation knowledge for boiler operators, and training and assessment records.

3. Boiler user units shall establish energy efficiency assessment, reward and punishment mechanisms, actively implement contracted energy management based on the actual situation of the unit, arrange regular energy efficiency tests, and timely rectify those that do not meet the energy conservation requirements.

4. The boiler user shall regularly maintain the equipment, instruments, devices, pipes and valves of the boiler and its system. If any abnormal situation is found, it shall deal with it in time and record it.

5. The boiler user shall carry out daily inspection and monitoring of the energy efficiency of boilers and their systems. The key inspection and monitoring items include the conformity of the boiler fuel and the design fuel, fuel consumption, medium outlet temperature and pressure, boiler recharge water and recharge water temperature, exhaust temperature, furnace wall surface temperature, and whether the system runs, runs, drops, leaks, etc.

6.The boiler user shall strengthen energy testing, measurement and statistics. The use units of industrial boilers should evaluate the operating energy efficiency of boilers and their systems regularly according to the "Industrial Boiler Energy Efficiency Test and Evaluation Rules" (TSG G0003).

7. The boiler user shall conduct a regular energy efficiency test of the boiler in use once every two years. The test shall be conducted by the energy efficiency test institution determined by the General Administration of Quality Supervision, Inspection and Quarantine in combination with the external inspection of the boiler.

8. Boiler operators shall timely dispatch and adjust the operating quantity and output of boilers according to the changes of steam capacity and heat load of end-users, and boiler rooms where conditions permit may install automatic boiler load regulating devices.

9.Boiler water (medium) treatment shall meet the requirements of boiler water

(medium) treatment safety technical specifications and corresponding standards
10. The normal discharge rate of industrial boilers shall meet the following requirements:
1, to soften water as the supply water or simply using the pot dosing treatment of industrial boilers is not higher than 10%;
2, to debrine as the supply water of industrial boilers is not more than 2%;
11. The boiler user shall, in accordance with the Measures for Supervision and Administration of Energy Conservation of High Energy Consuming Special Equipment, establish the energy efficiency technical archives of high energy consuming special equipment. The user units where conditions allow shall centrally and uniformly manage the archives of boiler product energy efficiency technology, product quality archives and equipment use archives (one copy of the same part of the archives may be kept). Boiler energy efficiency technology archives shall include at least the following contents:
(1) Delivery data of boiler products (including product energy efficiency test report);
(2) Quality certificate of auxiliary boiler and auxiliary equipment;
(3) Boiler installation and commissioning report, energy saving transformation data;
(4) Energy efficiency evaluation or energy efficiency test report of boiler installation, renovation and maintenance;
(5) Periodic test report of in-service boiler energy efficiency and annual operating energy efficiency evaluation report;
(6) Daily energy saving inspection records of boilers and their systems;
(7) Measuring and testing instrument verification certificate;
(8) Boiler water (medium) quality treatment inspection report;
(9) Fuel analysis report.
12. Customer service
Our factory sincerely serves our customers to ensure the reliable operation of your organic heat carrier furnace system and eliminate your worries at home.
1, provide organic heat carrier furnace body and system equipment installation and use of various technical consultation.
2. Guided the project installation, commissioning and operation of customers, and assisted in solving technical problems.
3. Design and consult heating equipment and system on behalf of customers.
4. Provide matching and replacement of wearing parts.
5. Select and purchase heat conduction oil on behalf of customers.

IV、Burner configuration, installation, debugging, use, maintenance, troubleshooting instructions

1. Before installation, commissioning and use of burner, please carefully read the

attached technical data (boiler drawing, boiler installation and operation manual, burner installation and operation manual, etc.), and strictly follow the operation procedures.

2. Oil-fired and gas-fired boilers shall be equipped with the corresponding interlock protection device and the ignition program control device and flame-out protection device according to article 6.6.5 of TSG G0001-2012 boiler Safety Technical Supervision Regulations and Article 6.6.6.

Ⅰ、Configuration of oil and gas boiler burners

(1) The configuration of oil and gas boiler burner should meet the specific configuration requirements of the boiler (see the boiler drawing for details), such as back pressure, output, flame diameter, flame length, etc.

(2) Burners should meet the requirements of safety technical specifications and standards such as TSG G0001-2012 "Boiler Safety Technical Supervision Regulations", and oil and gas burners should pass the type test.

Ⅱ、Oil and gas boiler burner system setup and installation

After the boiler fuel is determined, it is very important to set up the fuel supply system correctly.

a、Light oil supply System (see attached Figure 1)

(1) Choose the appropriate diameter of the oil supply pipe, and the oil flow rate in the pipe should be 0.7m/s ~ 1.5m/s.

(2) The oil circuit should be ensured to be sealed, so as not to mix with air and cause abnormal combustion.

(3) The capacity of light oil daily tank should be less than 1m3, the setting position is generally higher than the oil inlet of the burner oil pump, and there is a certain fire distance with the boiler.

(4) Oil filter should be set on the oil inlet pipe, the accuracy is about 60 mesh.

⑤ The setting of the return oil pipe should prevent the cutting device from being accidentally closed or other blocking.

The fuel quality should meet the requirements, so as not to cause abnormal wear of the oil pump.

b、Gas supply system (see attached Figure 2)

The biggest unsafe factor of gas system is gas leakage, leak detection device is the key part of gas supply system, the attached picture is the decomposition principle diagram of gas burner valve group, of course, there are differences for different brands of gas burner. In the figure, except manual valve, other valve groups are generally supplied by burners.

(1) The whole system should be ensured to be well sealed, and all pipes and fittings should be subjected to pressure tests at twice the working pressure, not less than 200mbar.
(2) Pressure regulating valve should be installed to ensure stable gas pressure (refer to the specific gas pressure burner manual, the burner comes with a pressure regulating valve for fine tuning only).
Gas filter is installed to ensure clean gas.
(4) If there is a relief valve discharge valve, the gas discharge pipe should be set up, and the discharge pipe should lead to a safe place outside.
Note: The leaking pipeline is strictly forbidden to be put into operation.

c、Installation of burner

When installation, first remove the burner from packing, depending on the gap between head and boiler combustion hole size, dense winding layers on the burner flame tube head asbestos rope, alignment before smoke box panel on the left of the crater level plugged into, before the final with the combustion engine flange bolts and smoke box burner connection flange connection is firm. When assembling, asbestos gasket must be added between the burner flange and the front smoke box burner connecting flange.

III、Check burner of oil and gas boiler before trial operation

a、Check the burner

Check whether the installation position of the burner is reasonable, whether the burner is convenient for maintenance, whether the oil and gas supply pipeline is smooth and tight. Oil pressure gauge, barometer indication is correct, ignition electrode, ignition position, small fire position, fire position is preset.

b、 boiler test, control instrument inspection

A. Check whether the thermal instrument and electrical equipment are in good condition, and check the effective inspection period and lead seal of the thermal instrument.
B. Check the position of the pressure gauge pointer and close the pressure gauge cock. If there is no pressure, the pressure gauge pointer with limiting nail should be at the limiting nail.
C. Check whether the temperature indicator is reasonable.
D. Check whether the pressure controller, electric actuator, thermal resistance and other circuits are smooth, sensitive reading and accurate action.

c、Check the electrical system

Check whether the power supply meets the rated voltage. Push the power supply to check whether the power supply meets the rated voltage and whether the power supply meets the rated voltage into the PDC. Remove the power supply to the main loop, simulate the ignition procedure, and see if the control loop is normal.

d、Check the fuel system

Start from the daily fuel tank without fuel, open the valve, check the filter, to release the dirty oil. Whether the loop from the service tank to the burner and from the burner to the service tank is unobserved. Check whether the position of the pressure regulating device is appropriate for the gas boiler, whether the ball valve is closed, and whether the valve of the gas supply line is complete.

IV、Trial operation (commissioning) of oil and gas boiler Burners

a、Ignition test

A. Check that the fuel for ignition is ready. Open the valve, pump air, set the oil pressure.
B. Fuel leakage inspection for ignition.
C. Do not transfer fuel, using ignition transformer to determine sparks.
D. Rotate the burner and fan, and confirm whether the ignition state of the igniter is stable and determine the brightness of the ignition burner (in addition to current and voltage) after the furnace is fully blown.

b、 Ignition of the main burner

A. Determine that fuel is sufficient and no leakage.
B. Clean the strainer.
C. Confirm the valve action in the pipeline. In addition, confirm whether the gasket is tightly packed.
D. The valves in the pipeline should be fully opened, and the fuel injection pump should be rotated to circulate oil and exhaust air from the pipeline.
E. Adjust oil pressure to rated range.
F. Purge in furnace for more than 30 seconds.
G. Confirm that the igniter is stable.
H. Open fuel valve and ignite.
I. Confirm that the amount of fuel is consistent with the specified amount after the fire, and then adjust the amount of air to make the combustion state stable. After the combustion is stable, the igniter will stop.
J. Stop the fuel supply if the burning condition remains stable after the igniter is stopped.

K. After cleaning for more than 20 seconds, the burner stops running.

c、automatic ignition and the use of minimum fire drying combustion

A. Automatically start burners, ignition devices, solenoid valves, etc.
B. After the ignition of the main fuel, set the manual potentiometer to the lowest manual position.
C. Dry run for 1-2 hours.

d、Fuel adjustment

A. Manually adjust the opening or pressure of the fuel valve or pump to match the boiler requirements.
B. At this time, the air baffle first produces smoke because of insufficient air, and the amount of combustion supporting air is adjusted.

e、 Action test and setting of safety devices

A. Remove the flame monitor and conduct a fire break test to confirm the alarm.
B. Confirm the interlocking action of the burner.
C. Setting of each thermal relay.
D. Periodic confirmation of pre and post purge.

f、 Determination of air volume

A. Don't smoke.
B. No extreme deviation of flame.
C. There is no coke adsorption on the flaring part and other parts of the burner.
D. fireflies do not fly.
E. No fuel has fallen into the burner side.
F. After qualified debugging, conduct a comprehensive inspection of the joints of all parts to prevent bolts from loosening.
G. Provide instructions for use, submit auxiliary tools, equipment and debugging reports, etc.

V、The use of oil and gas boiler burners

a、Preparation before use

A. The gas pipeline should be checked by the local gas company. If there is a pressure regulator on the pipeline, it should be tested to see whether it is sensitive and reliable, and check whether the gas pressure meets the gas supply pressure requirements of the combustion equipment.
B. Check whether the line voltage of all components (including pipe fittings) meets the requirements and whether the positions of switches are normal.
C. Adjust the control system to the "manual" position and check whether the starting

burner is normal (motor steering).
D. Check whether all the valve pressure gauges of the gas pipeline are normal, and check whether the butterfly valve cover is covered.
E. When the boiler is burning oil, check whether the valve on the supply/return pipe is fully open.
F. Check whether the oil supply system is normal and whether the oil quantity is sufficient.
G. Make a record after the inspection.

b、Running of the burner

A. After confirming the above conditions, the burner can be started normally.
B. Turn on the main power switch and the control circuit power switch.
C. Switch the main control function to automatic, and then press the boiler start and run switch, the boiler will enter the automatic ignition and combustion state. (If the ignition has failed for three consecutive times, it is forbidden to start again. The combustible material in the furnace should be purged first, and the problem can be ready to start again after being checked out.)
(complete) by burning program controller combustion engine start (fan motor, servo motor open the throttle to maximum - damper to the ignition position - pre-ignition - ignition electromagnetic valve open (flame detection) - the main electromagnetic valve open, servo motor to adjust the load (from ignition load to full load) - (bipolar adjust fuel gas and air). The boiler load is minimal or temporarily unloaded, temporarily shut down the furnace. When the boiler increases, it automatically purges -- ignires-burns and enters the adjustment operation.
D. Boiler start/stop is controlled by the temperature switch, when the temperature reaches the set temperature, the temperature switch automatically controls the burner flame size and close, when the boiler temperature drops to the starting temperature, the burner automatically run.
E. For the first combustion of the boiler, the switching time of the temperature controller and the combustion must be specially checked to ensure that it is basically the same.
F. The operation of electric control should refer to the operation instructions of electric control, and the operation and adjustment of the burner should follow the operation instructions of the burner.
G. When adjusting the combustion machine, the fuel quantity is generally adjusted first and then the air quantity is adjusted.
H. Burning flame under normal circumstances, the color of the flame is blue, when the blue is dazzling, it means that the air volume is too large, when the color of the flame is red, it means that the air volume is too small, when burning, the flame is rotated in the furnace and the flame is evenly distributed.
I. After the normal operation of the burner, the safety accessories should be sensitive and reliable. The stoker personnel should strengthen the inspection of the mechanical equipment and instruments, summarize the operation experience, improve the operation level and prevent accidents.

J. Matters needing attention during combustion operation:
(1) The fan is manually used for multiple ignition, to prevent ignition and deflagration again, and to blow forcibly to the furnace (diesel furnace with the requirements).
(2) When switching fuel, please press the stop button, and then turn the fuel switch to the selected fuel gear, and then restart the operation.
(3) After the combustor fault alarm, please press the reset button of the program controller after 30 seconds.
(4) The purge time is automatically set by the program and does not need to be adjusted.
(5) Boiler use units shall not secretly change and align the burner operation control program.

VI、Maintenance of oil and gas boiler burners

A. Ensure smooth and safe oil, gas and electric circuits during daily operation.
B. Pressure gauge, temperature controller and interlocking device shall be inspected regularly according to regulations.
C. Clean the diffuser and blower impeller of the combustion head, clean the flame probe (photosensitive electric eye), check the electrode and remove dirt every month to ensure sensitivity and reliability.
D. Clean the filter regularly.
E. The temperature of the burner accessories should not be too high, otherwise it will affect the operation or cause damage to the burner parts.
F. Unstable voltage may cause damage to burner components.
G. Avoid the burner being splashed with water.
H. Periodically tighten the connecting fasteners at the burner.
The user shall formulate and implement the operation rules and safety management system of explosion-proof, fire prevention, gas prevention, maintenance and regular overhaul system to ensure the safe operation of boilers and burners.

VII、Oil and gas boiler burner fault and troubleshooting

After a fault occurs, it should first check whether the basic prerequisites for normal operation are met:
1. Is there electricity? Is there any oil in the tank?
2. Is the gas pressure on the gas supply network normal? Is the ball valve open?
3. Are all regulators and interlocking protection devices set properly?
4. Is there any change in fuel volume and corresponding air distribution volume?
If the fault is not related to the above basic operating conditions, it must be checked in connection with the various related actions of the burner. For example, if the burner is found to stop working (locked in a fixed position), in order to find the fault, the burner should be reset first, and then the following checks should be carried out. Most possible faults will be found quickly and eliminated.

Common failures of burners

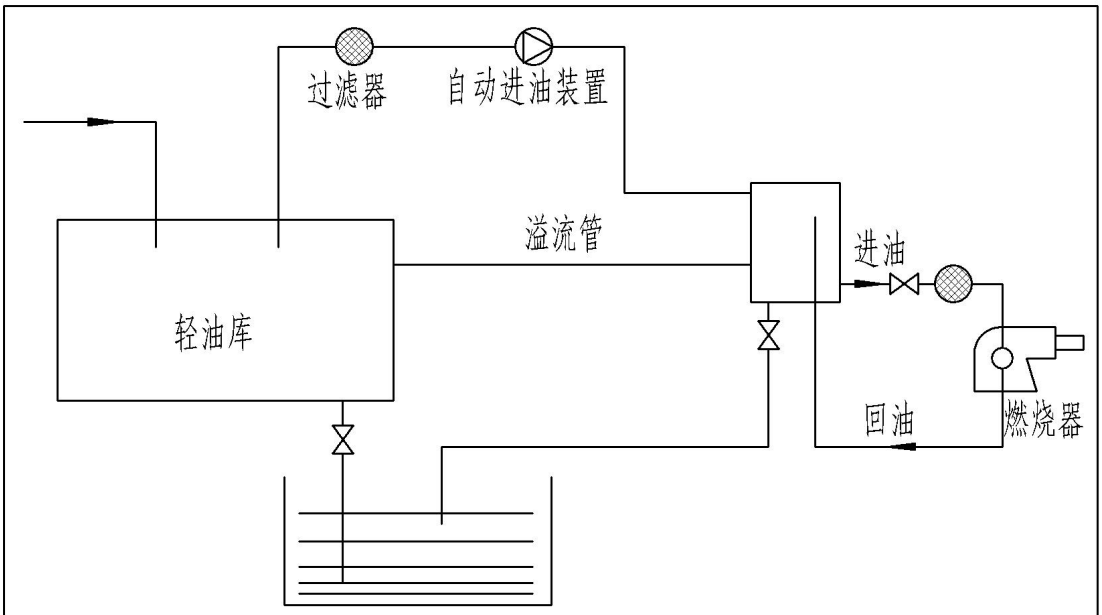
The fault phenomenon	The reasons causing	The solution
The burner doesn't start	There's no electricity	Close all switches and check the fuse
	Limit or safety control on	Adjust or replace
	Control box locking	Press the reset button of the control box
	Motor lock	Press the thermal relay reset button
	Pump is bad	replace
	The fuse of the controller is disconnected	replace
	Electrical connection error	Checking electrical Connections
	Control box damaged	replace
	The motor control device is damaged	replace
	Motor damage	replace
	Photocell short-circuited	replace
	Light leakage or simulated flame appearance	Clear light leakage or replace the controller
Stop the burner immediately after it starts	Lack of phase	Press the thermal relay reset button
The burner is locked immediately after pre-blowing and the flame appears	There is no oil in the tank or water at the bottom of the tank	Refueling or draining
	Improper position of burner head or damper	To adjust
	Solenoid valve does not open	Check the wiring and replace the coil
	Nozzle blocked, dirty or damaged	Clear or replace
	The ignition electrode is in the wrong position	Adjust and clear
	The ground wire is not well insulated	replace
	High voltage cable damage	replace
	Ignition transformer damage	replace
	Solenoid valve or ignition transformer wiring error	check
	Control box damaged	replace
	Pump does not start	Start according to operation procedure
	The coupling between the pump and the motor is damaged	replace

Burner locks after flame appears	The inlet and return tubing are incorrectly connected	correct
	Dirty screen of pump, strainer or nozzle	cleaning
	Motor steering error	In the phase
	The ignition electrode is in the wrong position	Adjust the
	The photocell or controller is damaged	replace
	Photocell dirty	cleaning
Pulsating ignition or flame instability	The burner head is not set properly	Adjust the
	The ignition electrode is in the wrong position	Adjust the
	Air door is too big	Adjust the
	The nozzle is not suitable for this burner or boiler	Check and adjust
	The nozzle is broken	replace
	Improper pumping pressure	Adjust according to manual
Burners do not burn large fires	Control system TR is not on	Adjust or replace
	Controller damage	replace
	The second solenoid valve is damaged	replace
	Hydraulic cylinder damage	replace
The second nozzle sprayed oil but could not reach the damper position	Pump pressure is low	increase
	Hydraulic cylinder damage	replace
Unstable oil supply	It may be caused by the pump or oil system	Keep the tank close to the burner
Rust in oil pump	There is water in the tank	Drain the tank of water
There is noise and the oil pressure is unstable	There is air in the inlet pipe	Fasten the joint
The negative pressure is too high (more than 46.6 kPa)	Tank/burner height difference too large	Use annular oil connection to burner
	Pipe diameter too small	increase
	Filter blockage	cleaning
	The inlet valve is closed	Open the

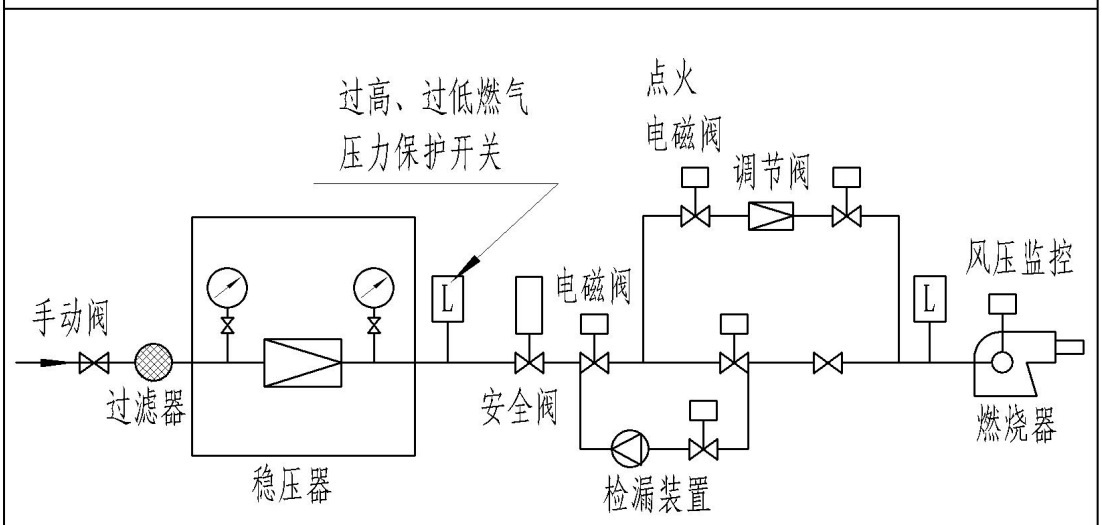
	Wax precipitates at too low temperature	Add additives to light oil
The pump does not start after a long interruption	The return pipe is not immersed in oil	Return it to the inlet height
	Air is entered in the oil inlet line	Fasten the joint
Pump oil	Leakage of sealing parts	In the pump
Smoke ~ black smoke	Lack of air	Adjust the combustion damper according to the manual
	The nozzle is worn or dirty	replace
	Nozzle filter blocked	Clear or replace
	Pump pressure adjustable wrong	Adjust to 1.0~1.4MPa (light oil)
	The fan is dirty	cleaning
	The blade of steady fire is dirty, loose or deformed	Clean, tighten or replace
Smoke ~ white smoke	Too much resistance in the furnace	expand
	The air is too much	Adjust damper according to manual
The burner is dirty	Nozzle or filter dirty	replace
	Nozzle oil or Angle is not appropriate	Refer to recommended nozzles
	Nozzle loose	Tighten the
	There are sundries on the steady blade	cleaning
	Burner head calibration error or insufficient air	Adjust according to instructions and open valve
	The length of air duct is not suitable for the boiler	Reference boiler section
Burner does not start	Limit control device on	Adjust or replace
	Control box locking	reset
	No gas supply	Open the manual valve closure switch between the flowmeter or valve group or check the connection
	There is no power supply	Check the attachment
	The fuse of the control box is blown	replace
	Servo motor front contact is not calibrated	Adjust the CAM or replace the servo motor

	Air supply pressure on main road is insufficient	Contact the gas company
	Minimum gas pressure switch is not closed	Adjust or replace
	The air pressure switch is in operation position	replace
	Control box damaged	replace
	Motor damage	replace
Start under burner but lock occurs	There's a simulated flame	Replace the control box
The burner starts but stops at the maximum damper position	The contact of the servo motor of CAM 2 does not reach the operating control panel terminal	Adjust CAM 1 or replace servo motor
Burner starting But immediately shut down	There is no central	Arrange the center line for three pole power supply
Since the burner Move after the lock	The air pressure switch is not properly adjusted	Adjust or replace
	The pressure tube of pressure switch is blocked	cleaning
	The fan is dirty	cleaning
	The head is not adjusted properly	Adjust the
The burner is locked after starting	Excessive back pressure of burner	ask
	The flame detection loop is faulty	Replace the control box
The burner stays in the pre-purge price section	CAM 3 servo motor contacts are not acting on the control box terminals	Adjust CAM 3 or replace servo motor
After pre-purge and safety time, the burner is locked and the flame does not	The solenoid valve allows only a small amount of gas to pass	Increase the outlet pressure of the regulator
	Gas pressure too low	Adjust the
	Incorrect ignition electrode adjustment	Adjust the
	There is air in the pipe	Purging air

appear	Incorrect electrical connection of valve or ignition transformer	Reconnect the
	Ignition transformer damage	replace
	High pressure device damage	replace
	Solenoid valve does not open	Replace the coil or correct the panel
The burner locks when the flame appears	Incorrect ion probe adjustment	Adjust the
	There is a problem with the ion probe connection	Reconnect the
	Insufficient ion current (less than 6uA)	Check probe position
	The probe,	Remove or replace the cable
	Maximum gas pressure switch function	Adjust or replace
Burner repeats The dynamic section is not locked	Main gas pressure is close to minimum gas pressure open The value set by the. After the electromagnetic generation is opened, the pressure of the Change to reduce the pressure switch itself off, electromagnetic The valve closes immediately, the burner stops and the pressure starts again Rise, gas pressure switch closed again, ignition cycle The repetition begins, and the repetition continues	Reduce the transport of minimum gas pressure switches Run the pressure or replace the gas filter
Locked but not Symbols indicating	To simulate the flame	Replacing a Controller
In operation Burner lock	The probe or ion cable is grounded	Replace the broken parts
	The air pressure switch is faulty	replace
	Maximum gas pressure switch function	Adjust or replace
Burner is locked when shut down	There is still a flame or simulated flame in the burner head	Clear the flame or replace the control box



轻油供应系统原理图（附图一）



燃气阀组分解原理图（附图二）