WNS type steam boiler

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Installation and operation instruction

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Directory

Dear users,
Please take the boiler technical data to the local boiler safety supervision department to go through the installation notification procedure before the boiler installation.

I、Boiler specification and structure brief introduction

I. Overview and scope of the system

This specification is applicable to WNS series oil and gas steam boiler produced by our company.
In order to ensure the safety of boiler operation and the safety of working people's lives and property, The design, manufacture, installation, transformation, maintenance, use, inspection and testing of boilers must be strictly in accordance with TSG G0001-2012 Boiler Safety Technical Supervision Regulations, GB/T16508.1 ~ 16508.8-2013 Shell Boilers and TSG G0002-2010 "Boiler Energy saving Technology supervision and Management regulations".
The boiler installation unit shall have the corresponding boiler installation license and go through the installation notification formalities with the boiler safety supervision organization of the local market supervision and administration bureau before installing the boiler. Only then can the installation and construction be carried out in accordance with the design drawings of the boiler room and be subject to the inspection and inspection of the local market supervision and administration administration during the construction process. After the installation and acceptance of the boiler is qualified, the boiler user shall go through the registration procedures in accordance with the Measures for the Registration of the Use of boilers. The boiler which has not gone through the registration procedures shall not be put into use.

II、Brief introduction of structure

WNS type oil-gas steam boiler adopts horizontal internal combustion three-return structure, and combustion mode adopts micro positive chamber combustion. The boiler body is composed of a drum, a corrugated - flat combination furnace, a backburning chamber and a threaded smoke pipe. The fuel is ignited by the electronic ignition rod after mixing with the air in the burner, and is injected into the furnace for combustion. The high-temperature flue gas enters the convection flue pipe from the backcombustion chamber and enters the energy saving device through the outlet to meet the requirements of the exhaust temperature. Finally, the flue gas is discharged into the atmosphere by the chimney.
Structure features:
(1) The burner adopts a three-return structure arranged in the front. The flame burns

under micro-positive pressure in the furnace, which strengthens the heat transfer, thus reducing the convection heating area, small flue gas flow resistance, low operation power consumption, and saving operation costs.
(2) The boiler uses centrifugal glass wool as insulation material, which has good insulation performance, light weight and less heat dissipation loss.
(3) The whole boiler system is safe and reliable, water supply directly into the boiler water inlet pipe, equipped with safety valve and pressure controller, so that the boiler is always in a safe and efficient operation state.
(4) significant environmental protection effect: soot emission concentration ≤50mg/Nm3, Greenman blackness grade I, noise ≤60 db.
(5) The flue gas economizer adopts circular atmospheric pressure energy-saving condenser, which is safe and reliable to use at atmospheric pressure. The energy economizer is connected with the soft water tank, and there is a hot water circulation pump in the middle for uninterrupted circulation, which can reduce the exhaust temperature and improve the thermal efficiency of the boiler.

III、Performance characteristics

The whole boiler factory, equipped with imported combustion equipment burner, can achieve full automatic control of combustion. The boiler is provided with a computer control cabinet, the control cabinet is provided with a thermal parameter display instrument, control button; The boiler has high and low water level alarm, and low water level chain protection function.**The boiler equipped with burner should fully comply with the requirements of "Boiler Safety Technical Supervision Regulations".**
If the use of the unit to buy the burner, did not choose the burner manufacturer and model recommended by our company, should confirm the matching burner is in line with the configuration of our company's boiler technical requirements. Our company will not be responsible for any problems caused by improper selection of burners.

II、Installation instructions

I、Preparation before installation

Users should reasonably choose the boiler type, quantity and capacity according to the heat load demand and its variation characteristics, so that the boiler can operate under the best energy efficiency condition. The boiler is assembled factory, the use of units should be commissioned by qualified architectural design units for boiler room design, design should be according to GB50041-2008 "boiler room design code" design.
(1) Determine the installation unit. Installation unit must have the corresponding boiler installation qualification!!

(2) Handling notification procedures. Before the installation to the local market supervision and management department for installation informed procedures!!
(3) installation quality sectional acceptance and hydraulic test, by the boiler installation unit and the use of units jointly, the overall acceptance should also be boiler and pressure vessel safety supervision agency representatives attend!!
(4) after the installation and acceptance is qualified, the boiler user shall go through the boiler registration formalities with the boiler and pressure vessel safety supervision institution of the local market supervision and administration department by holding the relevant data, and obtain the boiler registration certificate before it can be put into use!!
(5) the boiler must have the market supervision and management department examination qualified furnace personnel operation!!
(6) Organize the staff to learn installation technical measures, safety technical measures, TSG G0001-2012 Boiler Safety Technology Supervision Regulations, TSG G0002-2010 Boiler Energy Saving Technology Supervision and Management Regulations, GB50273-2009 Boiler Installation Engineering Construction and Acceptance Specifications, Gb50236-2011 "Code for Construction and Acceptance of Field Equipment and Industrial Pipeline Welding Engineering", GB50211-2014 "Code for Construction and Acceptance of Industrial Furnace Masonry Engineering" and familiar with boiler drawings and related technical documents.
(7) Before the installation of the boiler, the boiler body, combustion equipment, parts, auxiliary machinery and accessories shall be checked and counted according to the technical documents, and the record shall be made well. If the boiler does not meet the relevant standards, it shall be put forward to the factory in time.
According to the provisions of Article 16 of TSG G0002-2010 "Regulations on Supervision and Management of Boiler Energy Saving Technology", the boiler house system design shall, on the premise of ensuring safety performance, fully improve energy utilization efficiency, reduce water, electricity, self-use heat and other consumption, and promote heat recovery and cascade utilization. Boiler room equipment layout should minimize the length of the pipe, smoke duct and the number of elbows, in order to reduce flow resistance.

The foundation for

(1) Determine the installation position of the auxiliary boiler (including water pump, water treatment equipment, etc.).
(2) Redesign by civil engineering department according to local soil quality with reference to the foundation plan provided.
(3) The foundation surface should be smooth and smooth, the left and right irregularity should not be greater than 3mm/m. The surface irregularity should not be greater than 5mm/m, and the total length irregularity should not be greater than 10mm/m.
(4) All reserved holes shall be cast after the auxiliary machine is installed in place.
(5) After the foundation acceptance is qualified, the base line of boiler installation shall be drawn according to the foundation drawing. The base line shall be clearly

marked, and the displacement deviation shall not be greater than 5 mm.
(6) Equipment acceptance: check the parts and components one by one according to the factory list, and pay attention to whether the large boiler is damaged or deformed during transportation. Installation can be carried out after acceptance.

Notes:

(1) The boiler installation site must have 230/50 (V/HZ), sufficient capacity of power supply, enough space for operation and maintenance (the front and rear ends are not less than 1.2m).
(2) The boiler installation site should be ventilated and dry, in line with the fire conditions; Shall not be near inflammable and explosive articles; Do not install it in damp, open air or places corroded by strong acid or alkali.
(3) The boiler installation site shall not have high voltage strong electric interference source, so as not to cause the control system error action.
(4) Boiler power supply inlet line should have enough section. (Water level and pressure controller wiring requires shielding wire)
(5) The boiler should be reliably grounded.

II、Overall installation of boilers

Lift the boiler assembly on the drum lifting lug to make the boiler base coincide with the pre-drawn datum line on the foundation. The deviation between the longitudinal center line of the boiler and the foundation shall not be more than 3mm, and the line hammer shall be used to correct the inclination of the center of the drum, and the inclination of the center of the drum shall not be more than 5mm, otherwise the pad iron shall be used to smooth the junction of the base and the foundation.
Before boiler installation, longitudinal and transverse installation centerlines shall be marked and the two centerlines shall be perpendicular to each other.

III、Installation of combustion system

The installation of oil circuit or gas circuit is carried out according to the boiler room design.
After the fuel system is installed, the hydraulic test shall be carried out at 1.25 times the working pressure (the minimum test pressure shall not be less than 0.4mpa).
The fuel oil system pipeline shall be washed with water or steam after installation, and shall be washed with approved technical measures. The number of blowing and washing shall not be less than two times until the clean medium is blown out. Dead corners and residues shall be removed after blowing and washing.
After the fuel system is installed, the whole system oil circulation test should be carried out.
The gas should be sent to the burner in the shortest distance, and the diameter of the gas supply pipe must be a certain value larger than the accessory pipe of the burner.

Gas pipe installation should be done after the air tightness test, the test in advance without accessories parts with more than 1 bar air or inert gas, total test including from the main cutting device on the burner block valves of all equipment, pipeline under the condition of the solenoid valve closed with air or 1.1 times the working pressure of the inert gas, but the pressure must be at least above 50 mbar, Brush joints with foam or material that does not cause corrosion.

The light oil and natural gas burners of this type of boiler are consistent with the nozzle flange of the boiler interface, so the nozzle of this type of boiler does not need to be replaced when the burner is replaced, only the fuel transmission pipeline needs to be replaced.

IV、The installation of computer control cabinet

A variety of control switch buttons for burner and water pump are collected on the computer control cabinet. The user can first pull the wire to each motor and then connect the external total power supply. Note: The case should be grounded protectively.

The computer control cabinet should be installed in front of the boiler, should be close to the wall, to facilitate the monitoring of various instruments on the boiler, and ensure easy operation.

V、Installation and debugging of pipes, valves, instruments and accessories

警示：水位、压力报警和连锁保护装置失灵，可能导致锅炉发生爆炸，切不可退出。不按规定装置管道、阀门、仪表，会导致锅炉爆炸！！！

Before installation, the instrument should be calibrated and the valve should be tested.

When installing pipes, valves and instruments, install them according to the requirements of automatic control (or electric control circuit diagram) and related drawings. The electric pump is fixed in the appropriate position, and the test run is turned on after power supply.

If the alarm or chain protection device is damaged, it should be repaired in time, and the boiler can run after repair.

a、Safety valve

The boiler shall be equipped with safety valves according to the valve instrument drawing and shall be simultaneously provided with at least two safety valves (including drum and superheater safety valves) per boiler. Only one safety valve may be installed if one of the following requirements is met:

(1) steam boiler with rated evaporation less than or equal to 0.5t/h;

(2) steam boiler with rated evaporation less than 4t/h and equipped with reliable overpressure interlocking protection device;

Safety valve installation:

(1) The safety valve should be installed after the hydraulic test, and should be installed in the cylinder (shell), the highest position of the box, between the safety valve and the cylinder (shell) or between the safety valve and the box, should not be installed to take steam or hot water pipeline and valve;
(2) Several safety valves are jointly arranged on a short pipe directly connected with the drum (shell), the circulation cross-sectional area of the short pipe should not be less than the sum of the circulation cross-sectional area of all safety valves.
Spring - loaded safety valve should be lifting handle and prevent random screw adjustment device.

Steam boiler safety valve exhaust steam pipe:

(1) the safety valve should be connected with the exhaust pipe, the exhaust pipe should be straight to the safe place, and have enough cross-sectional area to ensure that the exhaust steam is smooth, and the exhaust pipe should be fixed, there should be no external force from the exhaust pipe applied to the safety valve.
(2) the bottom of the relief valve exhaust pipe should be equipped with a drain pipe connected to a safe place, and a valve should not be installed on the drain pipe.
(3) The exhaust pipes of two independent safety valves should not be connected.
(4) if the relief valve exhaust pipe is equipped with a muffler, its structure should have enough circulation cross-sectional area and reliable drainage device.
(5) if the exhaust pipe arranged in the open air is equipped with a protective cover, the installation of the protective cover should not interfere with the normal action and maintenance of the safety valve.

Safety valve calibration:

(1) the safety valve of the boiler should be checked at least once a year, and the check is generally carried out under the operating condition of the boiler. If the check is difficult or the safety valve is repaired, it can be carried out on the safety valve check table;
(2) After the repair and replacement of the newly installed boiler or safety valve, the setting pressure and sealing property should be verified;
(3) the safety valve shall be locked or sealed after verification, and the safety valve after verification shall be locked or sealed. The safety valve after verification shall not be thrown, smashed or collided in the process of handling or installation;
(4) the test results of setting pressure and sealing of safety valve shall be recorded in the boiler safety technical archives.

Use of safety valve in operation:

(1) The boiler operation safety valve should be regularly discharged test;
(2) In the operation of the boiler, the safety valve is not allowed to randomly disassemble and arbitrarily raise the setting pressure of the safety valve or make the safety valve fail.

b、Pressure gauge

Pressure gauges shall be installed in the following parts of the boiler:

(1) steam boiler drum (shell) steam space.
(2) before the water supply regulating valve.
(3) economizer export.
(4) between superheater outlet and main steam valve.
(5) oil pump inlet (oil return) and outlet of the ignition system of oil-fired boiler;
(6) the gas source of the ignition system of the gas boiler (oil return) and the gas valve group pressure regulating valve (pressure regulating valve);

Pressure gauge selection, selection of pressure gauge should meet the following requirements:

(1) The pressure gauge shall meet the requirements of the corresponding technical standards
(2) Pressure gauge accuracy grade selection according to the table below

Boiler manufacturing grade	Accuracy class of pressure gauge
Class B and below boiler	≥2.5 级
A-class boiler	≥1.6 级

(1) The range of the pressure gauge should be selected according to the working pressure, generally 1.5 times to 3.0 times of the working pressure, the best choice is 2 times
(2) The size of the pressure gauge dial should ensure that the boiler operator can clearly see the pressure indication value, the dial diameter should not be less than 100mm.

Pressure gauge calibration:

The pressure gauge should be checked before installation, and the red line indicating the working pressure should be marked on the dial, indicating the date of the next check. Pressure gauge should be sealed after verification.
Pressure gauge installation, pressure gauge installation should meet the following requirements:
(1) It shall be installed in a position convenient for observation and blowing and shall be protected from high temperature, freezing and vibration.
(2) the pressure gauge of the boiler steam space should have a trap pipe or other measures to cool the steam, the pressure gauge of the hot water boiler should also have a buffer elbow, the inner diameter of the elbow should not be less than 10mm.
(3) A three-way valve should be set between the pressure gauge and the elbow pipe for blowing and washing the pipeline, unloading and replacing, and testing the pressure gauge.

When the pressure gauge stops using, the pressure gauge should stop using when it has one of the following conditions:

(1) when there is no pressure on the pressure gauge with the limiting nail, the pointer can not return to the limiting nail after rotation; For pressure gauges without capping pins, the value at zero of the pointer exceeds the allowable deviation specified in the pressure gauge when there is no pressure.
(2) the surface glass is broken or the dial dial is blurred.
(3) The seal is damaged or the verification period has expired.
(4) Table leakage or pointer to.
(5) Other defects affecting accurate indication of the pressure gauge.

Pressure gauge To ensure the correctness of the pressure gauge, the installation, calibration and maintenance of the pressure gauge shall comply with the provisions of the national metrological department. The pressure gauge should be checked before installation and the date of next check should be indicated. A red line should be drawn on the dial to indicate the working pressure. When the pressure gauge is installed, the dial surface should be vertical, and a red line should be drawn on the dial to show the maximum allowable working pressure of the boiler. The cock of the pressure gauge can rotate flexibly, without steam leakage, and the drain should be unobstructed. The pressure gauge tube should not be insulated.

c、Water level measuring and control device (water level gauge)

Each steam boiler drum (shell) shall be provided with at least two independent direct reading water level meter, one of the following conditions can be provided with a direct reading water level meter;
(1) boiler with rated evaporation less than or equal to 0.5t/h;
(2) boiler with rated evaporation less than or equal to 2t/h and equipped with a reliable water level indicator and control device;
(3) Two separate sets of boilers with remote water level measuring devices;
(4) Electric heating boiler.

The water level gauge shall have a discharge valve and a discharge pipe at a safe place. There should be a valve on the water supply pipe between the water level gauge and the drum, and the valve must be in the full open position when the boiler is running. For a boiler with a rated evaporation capacity of less than 0.5t/h, a valve may not be installed on the steam pipe between the water gauge and the drum (shell).

The water level gauge shall have obvious marks indicating the highest, lowest safe water level and normal water level. The distance between the highest and lowest safety water levels and the visible edge of the water level gauge shall comply with the requirements of clause 1 of Article 6.3.2 of THE Boiler Safety Technical Supervision Regulation TSG G0001-2012.

Water level gauge installation:

(1) The water level gauge shall be installed in a place convenient for observation. When the water level gauge is higher than 6000mm from the operating ground, a remote water level measuring device or water level video monitoring system shall be installed;
(2) When the boiler water level is monitored by one or more remote water level measuring devices, the signals should be taken out independently; There shall be two reliable remote water level measuring devices in the control room and one direct reading water level meter shall be ensured to work properly during operation.

d、Temperature measurement device

Temperature measuring points shall be installed in the corresponding parts of the boiler to measure the following temperatures:
(1) feed water temperature of steam boiler (except normal temperature feed water);
(2) outlet water temperature of cast iron economizer;
(3) oil burner oil (except light oil) import oil temperature;
(4) air temperature at the inlet and outlet of air preheater;
(5) boiler air preheater inlet smoke temperature;
(6) Exhaust temperature.
Temperature measuring instrument range:
The temperature measuring range of the dial temperature measuring instrument should be selected according to the working temperature, generally 1.5 times to 2.0 times of the working temperature.

e、Sewage and water discharge device

(1) The boiler below class B adopts quick opening blowdown valve, the nominal diameter of the blowdown valve is 20mm ~ 65mm, and the nominal diameter of the blowdown valve on the shell of the horizontal shell boiler is not less than 40mm.
(2) For a steam boiler with a rated evaporation flow rate greater than 1t/h, the sewage pipe is provided with two valves in series, at least one of which is a sewage valve, and is installed near the outlet side of the sewage pipe.
(3) The lowest set box (or pipeline) of the energy-saving system is installed with a water release valve.
(4) Each boiler is equipped with independent sewage pipe, sewage pipe to minimize elbow, ensure smooth and connected to a safe place or sewage expansion tank (expansion container) if the use of pressure sewage expansion tank, sewage expansion tank needs to install a safety valve.
(5)When multiple boilers share a discharge main, it is necessary to avoid the simultaneous discharge of more than two boilers.
(6)boiler blowdown valve, blowdown pipe should not be threaded connection.

f 、 Steam pipes other than the main steam valve are connected by the user

There should be at least one elbow on the main steam valve pipeline, otherwise the expansion pipe should be installed, and the outer wall of the pipeline should be insulated. The manufacturer only provides part of the installation parts, and the rest of the straight pipe shall be provided by the user and assembled according to the drawing.

g、Safety interlock protection device

The boiler has the functions of high and low water level alarm, low water level chain protection, overpressure alarm and chain protection.

1、Basic Requirements

(1) The steam boiler should set high and low water level alarm (high and low water level alarm signal should be able to distinguish), low water level interlocking protection device, interlocking protection device should be in the lowest water level at the latest action.

② The boiler whose evaporation is greater than or equal to 6t/h should be equipped with steam overpressure alarm and interlock protection device, and the action of the overpressure interlock protection device should be lower than the lower set pressure value of the safety valve.

(3) For boilers installed in multistory or high-rise buildings, each boiler shall be equipped with overpressure (temperature) interlocking protection device and low water level interlocking protection device.

(4) The range of the pressure controller should be selected according to the working pressure, generally 1.5 times to 3.0 times of the working pressure, and the best choice is 2 times

2、Pressure control:

① The pressure regulator 1YT is adjusted at 1.26mpa

② The pressure regulator 2YT is adjusted at 1.28mpa

The pressure regulator 3YT is adjusted at 1.29mpa

3、Water level control:

Water level control alarm

(1) when the normal water level is higher than 35mm, a high water alarm is generated.

(2)When the normal water level is -35mm, the low water level alarm is generated.

(3) When the normal water level is -50mm, the protective furnace shutdown is started.

4、Ignition control:

The combustion program controller provides a separate set of start-stop control

contacts. All kinds of burners can be prepared, start and stop control relay loop series has a 10A fuse, start and stop control relay can be connected to the start and stop control end of the burner, can also directly control the power supply of the burner.

5、Alarm signal status:

(1) When the normal water level is +35mm, the yellow indicator is on, indicating the state of high water level, and there is an electric bell sound indicating the high water level alarm.
(2) When the normal water level is -35mm, the red indicator is on, and the electric bell sound indicates the low water level alarm, and the pump start procedure is started.
(3) Under the normal water level of -50mm, there is a red indicator light indicating the very low water level, and an electric bell sound indicating the very low water level alarm, and start the protective furnace shutdown procedure.
(4)When the normal pressure is 1.26mpa, the red indicator is on and the alarm bell is issued.
(5)When the normal pressure is 1.28mpa, the red indicator is on, indicating that the pressure exceeds 1.28mpa and the first level (small fire) fire state is implemented.
(6)When the normal pressure exceeds 1.29mpa, the output electric bell will sound the alarm, cut off the power supply of the burner, and implement emergency stop the furnace.
(7)When the burner can not work normally because of various faults, the output failure alarm, red indicator light, and an electric bell sound.

6、Indicating state:

(1) When the pump is running and in the automatic state, the "automatic" signal is on. When the pump is in the manual state, the "manual" signal is on with the green indicator light.
(2) High water level, fire burning, small fire burning state with yellow indicator light.
(3) Water level, extremely low water level, overpressure, burner failure and other states are indicated by red indicator light.

7、Principle of system control:

(1) after close the power switch, click on the water pump control switch is open position, after boiler feed water to rise to normal position, click on the burner after the power switch, click the start button, the electricity control system, burner into work state, in accordance with the procedure of the controller action program, to the small fire burning in the fire burning again, to the normal operation of the boiler into the stage.
(2) When the water level rises to the high water level, the output high water level alarm signal indicator is on, accompanied by an electric bell sound, and the realization of protection furnace cut off the controller power supply.
When the water level rises to +35mm, the pump stops running, and when the water level drops to -35mmm, the pump automatically restarts.
When the water level drops to -50mm, the output low water level alarm signal

indicator is on, accompanied by an electric bell sound, and the protection of the furnace cut off the controller power supply.
(3) When the pressure rises to 1.28mpa, the output first overpressure signal indicator light, and cut off the controller combustion condition loop, the controller stops working and stop the furnace.
(4) When the pressure rises to more than 1.29mpa, the output second overpressure signal, an electric bell sound, alarm and cut off the power supply of the control system to achieve emergency shutdown.
(5)When the pressure exceeds the upper limit of the adjustment pressure, the controller output small fire signal to close the fire valve, open the small fire valve to small fire combustion.
(6)When the pressure drops to the lower limit of the adjustment pressure, the controller output fire signal to open the fire valve, to fire combustion, after the failure of the burner, the combustion controller automatically closes the valve to stop combustion.

8、Alarm protection:

After the automatic controller is opened, it constantly detects the pressure sensor, water level, power supply, fuel oil and gas pressure set value. The pressure sensor, water level, power supply, fuel oil, gas and its own circuit are tested at all times. When problems are found, the alarm is immediately reported and the furnace is stopped for protection. The controller automatically displays the fault point, and the alarm sound is emitted inside the machine.

h、Pressure controller

(1) This series of pressure controller has two installation forms:

(1) Transitional installation with mounting plate: When installing this method, note: The length of the 4 M4 mounting screws used should not exceed 6mm (the screws of this specification are delivered with the factory as accessories).
(2) Direct installation with the controller body: it should be noted that between the bottom of the controller shell and the mounting surface, two ϕ 6 flat washers must be placed on each mounting hole.
(3) The controller should pay attention to when installing the connecting pipe, must not use a wrench to directly tighten the nut plate, must use two wrenches, respectively in the controller pipe joint and nut two end at the same time, to ensure that the controller will not be damaged, in addition, the connection of the copper tube should be soft (annealing).
(4) Electrical wiring, we must see the wiring diagram of the controller can be connected, so as to avoid the controller work wrong.

*** the sample:**

For example, the output pressure of the boiler is maintained between 1.0Mpa.
1. Choose 0-1.6mpa pressure controller.
2. Screw out the connecting nut of the controller, connect the pipe to the controlled

steam source, and then use two wrenches to connect the controller and the pipe seal, the controller switch wiring and access to the power supply circuit of the boiler.
3. Rotate the pressure adjusting screw, so that the pointer is at 1.01mpa. Rotate the differential pressure adjusting screw, so that the pointer indicates at 0.01mpa.
4. Switch on the power supply, make the compressor work, can achieve when the pressure rises to 1.0mpa switch off, when the pressure falls to 0.02mpa switch on the purpose.

i、Water level control alarm

Water level control alarm installation:

The sensor is installed between the furnace body and the water level gauge, and the lower end of the simplified form should be connected with a drain pipe. After installation, check whether the insulation resistance between the electrodes and the shell is good. The method is: with a meter or multimeter measurement, when the electrode out of the water, its resistance value shall not be less than 1M ω. If less than this value, must find out the reason, wiring should recognize the length and number of the electrode on the sensor.
The control circuit is connected with the 8-pin plug and the sensor electrode. When the 8-pin plug is connected, the 1, 2, 3 and 4 pins are respectively connected to the corresponding electrode of the sensor, and the 7-pin is connected to the sensor shell. A section of wire leading from the protective hole of the sensor electrode shell is preferably made of PVC insulated nylon jacketed wire with high temperature resistance. If common plastic copper core wire is used, glass fiber sleeve should be added. Hose should be used to protect the entrance, exit and vulnerable areas.
In order to realize the choice of "manual" and "automatic" control, the connection of the start and stop control lines of the feed water pump motor in the controller should be added with a switch. When the switch is set to the "automatic" position, the water level can be automatically controlled. When the switch is set to the "manual" position, although the pump automatic control function is lost, but still retain the water level display and high and low water level alarm function.

j、Installation of monitoring instruments

The surface temperature of various thermal equipment, thermal piping and valves shall not exceed 50℃;
The monitoring instrument shall be installed according to the requirements of automatic control (or the circuit diagram of the electric control cabinet). Refer to the technical document "Valve Instrument Diagram" delivered with the factory, and meet the requirements of the boiler instrument configuration in TSG G0002-2010 Annex B: The setting value shall be carried out in accordance with the "valve instrument figure" setting, such as the inlet flow meter installation, feed water flow measurement, set up the thermometer, pressure gauge, measuring the steam temperature and pressure, the tail set industrial bimetal thermometer, exhaust temperature measurement, the rated capacity is more than 4 t/h boiler shall also

furnish smoke O2 content, such as furnace outlet flue gas temperature measuring point; If the alarm or chain protection device is damaged, it should be repaired in time, and the boiler can run after repair.

VI、Installation of energy saver

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.

3. The energy saver is connected with the soft water tank, and there is a hot water circulation pump in the middle for uninterrupted circulation to prevent the energy saver from producing gas with pressure.

VII、Insulation and paint

After the pipe installation is completed, the insulation and paint should be carried out according to the corresponding standards and regulations after the pressure test.

VIII、Chimney installation

The chimney should be perpendicular to the ground, the weight of the chimney should not fall directly on the boiler, the top of the chimney should be equipped with a rain cap, must be equipped with a wave rope, and lightning protection measures. An industrial thermometer is mounted on the beam joint at the root of the chimney to monitor the exhaust temperature.

IX、Hydraulic test

Hydrostatic test shall be carried out on the steam and pressure system of the boiler and its auxiliary devices after their assembly. The pressure of hydrostatic test shall comply with the provisions of TSG G0001-2012 Boiler Safety Technical Supervision Regulations:

Hydrostatic test pressure

The name says	Pan drum (shell) working pressure P	Try to check pressure
The boiler body	＜0.8 MPa	1.5p but not less than 0.2mpa
The boiler body	0.8～1.6 MPa	P+0.4 MPa
The boiler body	＞1.6 MPa	1.25P

The water pressure test value of the boiler see the specific boiler body diagram!!

The following work shall be done before hydraulic test:

(1) Cleaning and surface inspection of the internal part of the test.

(2) Check whether the pipe is blocked.
(3) Install pressure gauges (not less than 2) that have passed the inspection.
(4) Install drainage pipes and vent valves.
(5) Hydraulic test shall meet the following requirements:
The water pressure should rise and fall slowly when the boiler is tested by water pressure. When the water pressure rises to the working pressure, the pressure should be suspended to check whether there is any leakage or abnormal phenomenon, and then the pressure is increased to the test pressure. The boiler shall be kept at test pressure for 20 minutes and then lowered to working pressure for inspection. Pressure shall remain constant during the inspection.
The hydrostatic test should be carried out when the ambient temperature is higher than 5℃, and anti-freezing measures must be taken when the temperature is lower than 5℃. The water used in the hydraulic test should be kept at a temperature higher than the surrounding dew point to prevent condensation on the surface of the boiler, but the temperature should not be too high to prevent vaporization and excessive temperature difference stress, generally 20 ~ 70℃.
The boiler is qualified when it meets the following conditions after hydraulic test:
(1) there is no water drop and water mist on the metal wall and weld of the pressure element.
(2) No residual deformation was found after hydrostatic test.
After the hydrostatic test, all the water should be discharged, and no water should be left in the boiler body and other parts.

X、Commissioning of oil and gas steam boilers

Burner selection parameter table:

Fuel type	Back pressure needs to be overcome	The demand for power	Flame diameter	The flame length	Flame Angle
Light oil	2.35 mbar	780KW	480mm	1480mm	90～120°
Natural gas	2.55 mbar	780KW	480mm	1480mm	90～120°

The burner should have the functions of gas high pressure and low pressure protection (prevent deignition and tempering), wind pressure protection, valve leak detection, flame detection, flaring protection and so on. In the program design, we must ensure that the burner has the function of starting purge and stopping purge, and the boiler control system must be interlinked to control and protect the pressure and level of the boiler.
After the installation, the system commissioning shall be jointly completed by the boiler user and the boiler installation unit or our company, and the commissioning shall be carried out by the boiler operators with corresponding qualifications. When it is necessary to debug the burner, the technical personnel of our company or its authorized units shall give on-site guidance; During the

commissioning of the boiler system and burner, the safety administration organ of the boiler using unit shall ensure that no irrelevant personnel shall gather near the boiler.

Boiler commissioning must be carried out after hydrostatic test. Before commissioning, the furnace body accessories, electronic control components, leads and other normal, water supply, oil circuit is open.

(1) According to the amount of oil (gas) consumption, preliminary adjustment of the damper, oil pressure.

(2) Switch on the power supply, turn on the power switch of the electric cabinet, and the pump starts to feed water into the furnace (if the pump turns and no water enters, open the pump exhaust valve to discharge the air in the pump).

(3) Check whether the control of water level electrode is normal.

(4) Check whether the operation of the burner is normal. When the water level rises to the normal level, the burner starts to burn, and observe whether the starting combustion is normal: starting without obvious vibration noise, burning smoothly, no black smoke, the flame is orange, yellow, bright and clear. Otherwise, make appropriate adjustments (please refer to the burner manual). **Note: The oil pressure is between 0.8 ~ 1.0mpa. After adjustment, do not change easily. Too high or too low oil pressure will affect the performance and life of the burner.**

(5) check whether the pointer of the pressure gauge swings smoothly and whether it is stuck or loose.

(6) check whether the safety valve exhaust steam when setting the setting pressure: first, the highest working pressure of the pressure controller is adjusted to 0.05MPa higher than the setting pressure of the safety valve. When the furnace pressure rises to the setting pressure, whether the steam is discharged. If the steam is not discharged, pull the safety valve for several times, and then try again. The setting pressure of the safety valve is 1.04 times of the boiler rated working pressure and 1.06 times of the boiler rated working pressure.

Note: The screw should be adjusted slowly, especially when the pointer is close to the end, otherwise, the screw will be damaged.

The modification and replacement of burners shall follow the relevant construction notification procedures in accordance with the regulations on boiler repair. The boiler burner manufacturer or its authorized unit is responsible for the modification, replacement and debugging of the boiler burner, and the boiler use unit should cooperate with the work. After the modification and replacement of the burner is completed, the user shall conduct self-inspection of safety accessories such as boiler safety valve and safety interlocking protection device, and form self-inspection records.

III、Directions for use

I、Boiler use and management

The user shall establish, improve and implement various systems for the safe operation and energy saving management of boilers and their systems. The specific contents shall be formulated in accordance with Chapter 8 of THE TSG G0001-2012 Boiler Safety Technology Supervision Regulations and Chapter 4 of the TSG G0002-2010 Boiler Energy Saving Technology Supervision regulations.

(1) The boiler user shall be responsible for the energy saving management of the boiler and its system. Technical personnel engaged in the administration of energy conservation shall have professional knowledge related to boilers and be familiar with relevant national laws, regulations, safety technical specifications and their corresponding standards.

(2) Boiler application units shall establish, improve and implement relevant systems for energy conservation management of 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) Daily energy saving inspection system of boilers and their systems, and make corresponding inspection records and archive;

3) Boiler fuel admission inspection analysis and management system, and the correct selection of fuel according to the design requirements;

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 users 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 included in the boiler and its system, and shall deal with and record any abnormal situation in time.

(5) Boiler users shall conduct daily inspection and monitoring of the energy efficiency of boilers and their systems. Key inspection and monitoring of the project, including the boiler use of fuel and design fuel compliance, fuel consumption, medium outlet temperature and pressure, boiler water supply and supply water temperature, exhaust temperature, furnace wall surface temperature, and whether the system is running, risking, dripping, leakage, etc.

(6) Boiler users shall strengthen energy testing, measurement and statistics. The use units of industrial boilers should regularly evaluate the energy efficiency of boilers and their systems, and the evaluation method should refer 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 should be carried out 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 should timely dispatch and adjust the number of boiler operation and the output of the boiler according to the change of steam capacity and heat load of the end user, and the boiler room can install automatic boiler load adjustment device if conditions permit.
(9) The normal discharge rate of industrial boilers shall meet the following requirements:
1) The industrial boiler with softened water as supplement water or simply using boiler dosing treatment is not higher than 10%;
2) No more than 2% of industrial boilers with debrine as the recharge water.
(10) Boiler water quality treatment shall meet the requirements of boiler water quality treatment safety technical specifications and phase response standards.
(11) The boiler user shall, in accordance with the Provisions of 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 certification materials for 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) Regular test report of in-use boiler energy efficiency and annual operation 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 quality treatment inspection report;
9) Fuel analysis report.

Warning: do not oven in accordance with the prescribed method, will make the furnace wall cracking, deformation, collapse, affect the safe operation of the boiler!

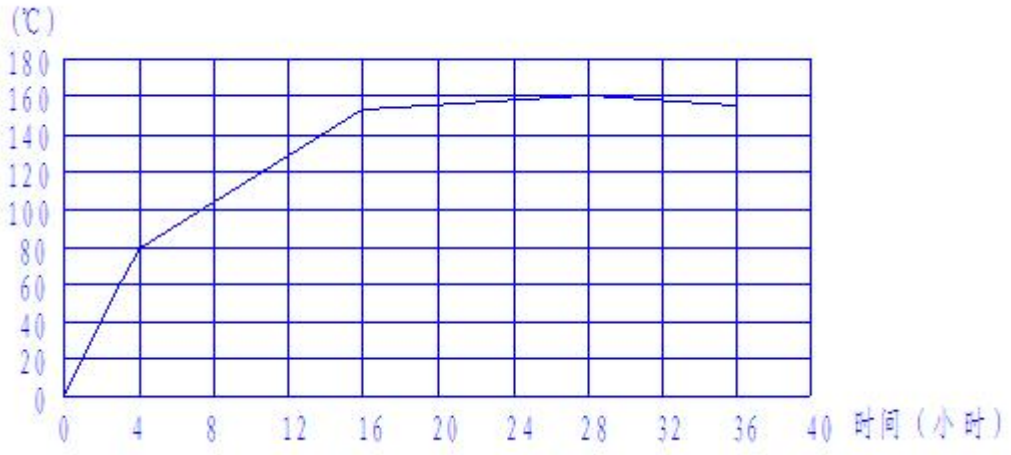
II、Oven

(1) the purpose of the oven: is to make the furnace wall to a certain degree of drying, to prevent the boiler operation due to the furnace wall moisture, hot expansion after uneven and according to the furnace wall cracking; In addition, the oven can also make the ash seam of the furnace wall achieve better strength, providing the high temperature resistance of the furnace wall.
(2) Preparation before the oven:
A, the boiler should be single test run before firing the oven.

B. Clean the furnace and related parts.
C. Check the working condition of water supply system and water treatment system.
D. Prepare fuel for oven.
(3) Matters needing attention:
For the oven, the temperature should not be greater than 10℃ per hour, the later temperature should not be greater than 160℃, and the highest temperature range should not be less than 24 hours.
(4) According to the determined heating scheme for the oven, attention should be paid to drawing the heating curve, and it will be stored in the boiler technical archives.
(5) the oven conforms to the requirements of the code, the masonry should not be deformed and cracked after baking, and the refractory concrete should not collapse, the measured moisture content of the furnace wall should not be less than 2.5%, and the oven can be considered qualified.

III、Cooking stove

Diagram of oven



Warning: boiler does not meet the requirements, will make the quality of steam deterioration, steam water co-transpiration, corrosion pipe fittings and other parts, harm the safety and economic operation of the boiler, affect the service life of the boiler!

(1) The purpose of the boiler is to add NaOH and Ha3Po4 in the boiler for chemical treatment, the use of alkaline boiler, the oil and rust in the pot to remove, to ensure that the boiler heating uniform, normal operation.
(2) The dosage of the boiler should meet the requirements of the technical documents of the equipment. If there is no requirement, it should meet the requirements in the following table:

Drug name	Dosage (Kg/m3 water)	
	Rust thin	Rust thicker
Sodium hydroxide.	2～3	3～4
Trisodium phosphate (Ha3Po4)	2～3	2～3

Note: ① The drug is calculated according to 100% purity.
②When there is no trisodium phosphate, sodium bicarbonate can be used instead, and the amount is 1.5 times that of trisodium phosphate.
③ Sodium carbonate boiler can be used alone, and its quantity is 6kg/m3 water.
(3) When dosing, furnace water should be at low water level.
(4) The boiler pressure should be kept at about 75% of the working pressure at the end of the cooking furnace, and the cooking time is generally 2-3 days.
(5) During the cooking period, take the furnace water regularly for analysis, and the basicity of the furnace water should not be lower than 45mmol/L, otherwise, supplement should be added.
(6) After the boiler is finished, the sediment in the drum and the collection box should be cleaned, the valve inside the boiler and the liquid medicine should be washed, and the sewage should be checked whether it is blocked.
(7) The following requirements shall be met after cooking:
① There should be no oil on the inner wall of the drum.
② There should be no rust on the metal surface after wiping the attachment.
(8) The boiler work can be carried out at the later stage of the oven.

IV、Relief valve adjustment

Warning: if the safety valve is not adjusted according to the regulations, the boiler will explode!!

(1) The sealing test should be carried out after the oven and cooking furnace are qualified.
(1) When the pressure is increased to 0.3 ~ 0.4mpa, tighten bolts of flanges, manholes, hand holes and other connecting parts in a hot state within the scope of the boiler.
(2) Continue to increase the pressure to the working pressure state for the following inspection:
A, each manhole, hand hole, valve, flange and gasket sealing.
B. Expansion of drum, pipeline and support.
(2) The pressure adjustment of the safety valve should be adjusted during the initial pressure boost, and the adjustment should meet the requirements in the following table.

Steam boiler safety valve setting pressure

The name of the	Rated steam pressure (MPa)	Setting pressure of relief valve
Steam boiler	≤0.8	Working pressure + 0.03mpa
		Working pressure + 0.05mpa
	0.8＜P≤5.9	1.04 times the working pressure
		1.06 times the working pressure

Note :(1) see the pipe instrument valve diagram for the setting pressure value of the safety valve.

(2) There must be a safety valve on the boiler to adjust to the lower set pressure in the table.

(3) The working pressure in the table refers to the working pressure at the place where the safety valve is installed.

(4) the safety valve should have no leakage and shock phenomenon.

(5) After the above qualified work, the boiler should be tested continuously for 4~24 hours at full load. During the test run, attention should be paid to check that all parts and auxiliary equipment are running normally as qualified.

V、The steam supply

When the steam pressure in the boiler is close to the working pressure, the fire should be slow when preparing for external steam supply, and the water level in the furnace before steam supply should not exceed the normal level.

Steam supply when the main steam valve should be slightly open, let warm trace steam pipe, open drain valve in the line at the same time, the condensed water, drainage to warm tube time according to the pipe length, diameter, steam temperature, and so on and so forth, generally not less than half an hour, warm pipe pipe supports should be paid attention to when, if found to have abnormal should stop warm tube, and eliminate the fault and defect, stay tube has been hot, After the condensate water on the pipeline is gradually reduced, the total steam valve can be fully opened, open slowly, and pay attention to whether there is a special sound in each part of the boiler. If there is, it should be checked immediately. After the total steam valve is fully opened, the total steam valve handwheel should be returned to half a circle to prevent the defect that the steam valve can not be rotated after thermal expansion. After the boiler steam supply should be again check the auxiliary parts, valves, instruments have leakage, etc., whether the work is normal.

VI、Warm pipe and steam

a、warm tube

The so-called warm pipe is to use steam to slowly heat the steam pipe, valve and flange at room temperature, so that the temperature is evenly increased, and the condensate water in the pipeline is driven out to prevent water hammer and damage

to the pipeline, valve and flange when steam is delivered. The warm pipe is generally carried out when the steam pressure of the boiler rises to two thirds of the rated working pressure, and the length of the time should be determined according to the length and diameter of the pipe, steam temperature, seasonal temperature and so on. General working pressure in 0.8mpa below the boiler, the warm tube time should not be less than 30min.

(1) The operation procedure of the warm pipe

For a single operating boiler, the scope of the warm pipe is the steam pipe before the main steam valve outlet to the steam equipment. Before the warm pipe, open all traps on the main steam pipe to discharge the condensed water accumulated in the steam pipe, and then close it until the official steam supply. Then slowly open the bypass valve on the main steam valve about half turn, let a small amount of steam into the pipeline, until the pipeline is fully preheated, and then the main steam valve fully open.

When several boilers are running at the same time, they share a steam pipe. The scope of the warm pipe is the section of pipe and pipe accessories before the main steam valve of the new boiler is started. The newly put into operation of the boiler, if there is a connection between the main steam valve and steam mother pipe isolation valve, isolation valve and boiler between the pipeline also need to warm pipe. Before the warm pipe, first open the main steam valve and all traps before the isolation valve, eliminate condensate, slowly open the main steam valve, using the steam generated in the process of boiler pressure to slow preheat, the pipeline with the boiler pressure rise temperature and pressure rise temperature at the same time, so as to save the warm pipe time, and safe and convenient. After the end of the warm pipe, close the trap on the pipeline, steam supply and boiler can be carried out.

(2) Matters needing attention when heating pipe

When the pipe is warm, if it is found that the pipe is expanded or the support and hanger is abnormal, or the pipe is shaken or water struck, it indicates that the warm pipe is heating up too fast, and the steam supply speed must be slowed down, that is, the main steam valve is turned down to reduce the steam flow, and the warm pipe time is extended. If the vibration noise is too large, the main steam valve should be closed immediately and the steam trap should be opened to stop the warm pipe. After the cause is found out and the fault is eliminated, the warm pipe should be continued.

Each steam valve should be turned half a turn after full opening, to prevent the steam valve because of heat expansion and stuck, can not be flexible switch.

b、And steam

Parallel steam is also called parallel furnace, that is, when two or more boilers are running at the same time, the newly put into operation boiler supplies steam to the steam mother pipe that is supplying steam. When the newly put into operation boiler has completed the steam pipe before the separation cylinder isolation valve warm pipe, boiler equipment and steam pipe operation normal, stable combustion, steam supply can be prepared.

(1) Before steam mixing, the boiler pressure should be slightly lower than the steam pipe pressure, so as not to cause rapid evaporation of water in the pot due to the sudden drop of pressure during steam mixing.
(2) Before steam should make the boiler water level at the lowest safety level, so as to avoid steam with water.
(3) Steam before steam analysis, steam quality should be qualified.
(4) When parallel steam, the bypass valve of parallel steam valve should be opened first, and then the steam valve should be opened. Open the valve slowly, and then close the bypass valve and steam valve bypass valve, steam valve trap, superheater trap.
(5) In the process of steam paralleling, close attention should be paid to the change of air pressure, air temperature and water level.

Ⅶ、Steam boiler operation management

(1) The prescribed normal water level must be maintained during the operation of the boiler, and the water level is not allowed to be lower than the lowest safe water level or higher than the highest safe water level.
(2) Constant attention should be paid to the working pressure, so that it is maintained at the normal steam pressure. The specified working pressure of the boiler shall be marked with red line on the pressure gauge of the boiler.
(3) Each shift shall carry out at least the following work:
1.Flush the glass water gauge once.
2.Check the tightness of drum, drain valve and trap.
3. According to the water quality of the boiler, all the blowdown valves discharge one to two times.
4.Whether all pumps are in good condition or not, should be tested in succession, with a short-time start operation method to check the work of each feed pump.
5.Equipped with direct reading water level gauge should check whether the direct reading water level gauge and glass water level gauge are consistent.
(4) the pressure gauge should be checked once every ten days, (the pressure gauge must be checked with the standard pressure gauge in general half a year).
(5) Often pay attention to the relationship between wind pressure and combustion, and must control the negative pressure at the exit of the combustion chamber for 20-30Pa, so that the boiler does not spray flue gas to the outside.
(6) Often patrol around the boiler, such as found in the furnace wall, furnace door gas leakage situation, should be repaired immediately, and listen to there is no special sound, these sounds may be the boiler water leakage, steam leakage situation, must pay attention to eliminate.
(7) Every one hour to the boiler body, electrical equipment, water pump, all kinds of valves, all kinds of instruments and auxiliary equipment for a circuit inspection.
(8) monthly check for boiler at least once a month, and completes the inspection record, monthly check content mainly for boiler pressure parts and its security accessories and instrumentation, chain protection devices are in good condition,

whether the boiler use safety and energy saving management system effective implementation, homework personnel certificate is valid period, whether regular inspection by the regulation, Whether water quality is regularly tested and analyzed, whether sewage discharge is adjusted according to changes in water vapor quality, and other anomalies.

(9) When opening the valve or cock, it is prohibited to knock with sledgehammer or other objects, and it is not allowed to lengthen the valve handle to open forcefully.

(10) in order to prevent the adhesion of the valve disc and valve seat of the safety valve, the safety valve should be regularly carried out manual and automatic steam release test.

(11) Operation of energy saving device (for boiler with energy saving device)

(12) The stoker should check and test the water level alarm and interlocking protection device regularly to make sure that they can play a normal role.

(13) If the alarm or chain protection device is damaged, it should be repaired in time, and the boiler can run after repair.

(14) Boiler using units shall not secretly change and unline burner operation control program boiler using units shall, in accordance with the requirements of boiler related safety technical specifications, the burner, boiler safety accessories and safety interlock routine inspection, and do a good job of inspection records. When it is necessary to repair the burner, the boiler using unit shall ask the burner manufacturing unit or its authorized unit to do so.

Start the circulation pump (installed at the outlet of the energy saver), open the inlet and outlet water valve on the energy saver, so that the water circulation in the energy saver is good;

Check the pressure loss at the inlet and outlet to confirm that the energy saver is working properly;

The energy saver is non-pressure equipment, it is strictly prohibited to operate under pressure!! The piping system should be installed separately, and the heated hot water can be entered into the soft water tank (the soft water tank should be insulated) as water for the boiler, and can also be used as hot water for other production processes and domestic use.

VIII、Sewage

Warning: do not discharge according to the regulations, it will lead to body bulge, water pipe blockage, cause pipe burst until the boiler burned, crack, explosion!!

(1) Continuous sewage discharge or water discharge is to make the furnace water basicity does not exceed a certain concentration, in line with the furnace water basicity requirements. Sewage discharge and water discharge should be controlled by adjusting the opening of the drainage valve or water discharge valve according to the results of chemical analysis.

(2) Regular sewage or water discharge is to eliminate the sediment in the drum, and the salt content of the furnace water can be adjusted to meet the requirements of the salt content of the furnace water.

(3) Regular sewage discharge should be carried out at low load, and the time should be as short as possible, so as not to affect the water cycle.
(4) The boiler water should be discharged at high water level when discharging, and the water level in the drum should be paid close attention to when discharging, and the water level in the drum should be reduced by 25-50mm every time.
(5) Sewage discharge operation procedures are as follows:
First fully open the second valve (from the drum direction), then slightly open the first valve to preheat the sewage pipe, and then open the first valve (at this time, there should be no impact sound in the sewage pipe, if there is impact sound, turn down the first valve until the impact sound disappears, and then slowly open), pay attention to control the amount of pollution. The procedure for closing is the opposite of the above.
(6) If two or more than two boilers use the same sewage main, and there is no check valve on the sewage pipe, two or more groups of sewage valves are prohibited to work at the same time.
(7) Do not use lever to extend the handle to open the drain valve.
(8) If the end of the sewage pipe is not through to the sewage box or sewage well, and there is no protection equipment, it must be sure that no one near the end of the sewage pipe can be discharged, so as to avoid accidents in the discharge.
(9) After the discharge is finished and the blowdown valve is closed, the blowdown valve should be checked whether it is tight. The inspection method is to close the blowdown valve, after a period of time, in the pipeline leaving the second blowdown valve by hand to test whether it is cooled, if not cooled, there is leakage at the blowdown valve.

IX、Water quality requirements

Warning: water quality does not meet the requirements, will make sediment sediment at the bottom of the boiler and the formation of scale, damage to the water circulation, tube overheating, deformation, tube burst, and even the body over-burning lead to boiler crack, explosion!!

The feed water of the boiler should be free of sediment and other sediments, and the water quality should meet the requirements of GB/T1576-2018 "Industrial Boiler Water Quality" standard.

The water quality of natural circulation steam boiler treated with external water should comply with the following table:

Distinguish	Rated steam pressure: MPa	P≤1.0	1.0＜P≤1.6	1.6＜P≤2.5	2.5＜P＜3.8

sh betw een	Type of recharge water		Demin eralize d water	In addi tio n to the bri ne	Demin eralize d water	In addi tio n to the bri ne	Demin eralize d water	In addi tio n to the bri ne	Demin eralize d water	In addi tio n to the brin e
Feed wate r	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		——	— —	⩽ 5.5×1 02	⩽ 1.1 ×10 2	⩽ 5.0×1 02	⩽ 1.0 ×10 2	⩽ 3.5×1 02	⩽ 80. 0
	Dissolved oxygen (do) amg/L		⩽0.10			⩽0.050				
	Oil mg/L		⩽2.0							
	Iron mg/L		⩽0.30					⩽0.10		
wate r	Total alkalinity b mmol/L	No super heate r	4.0 ～ 26.0	⩽ 26. 0	4.0 ～ 24.0	⩽ 24. 0	4.0 ～ 16.0	⩽ 16. 0	⩽12.0	
		Have a super heate r	——	— —	⩽14.0		⩽12.0			
	Phenolp hthalein alkalinity mmol/L	No super heate r	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.

X、Economic operation of boiler

(1) According to the article 17 of TSG G0002-2010 "Regulations for Supervision and Management of Boiler Energy Saving Technology", the user shall reasonably select the boiler type, quantity and capacity according to the characteristics of timely change of heat load demand, so that the boiler can operate under the best energy efficiency condition.
(2) During the operation of the boiler, it shall comply with the formulation of Article 13 of TSG G0002-2010 boiler Energy-saving Technical Supervision and Management Regulations: the boiler furnace wall, smoke duct, various thermal equipment, thermal pipelines and legal energy shall have good sealing and thermal insulation performance. When the ambient temperature is 25℃, the outer surface temperature of the furnace body 300mm away from the door (hole) shall not exceed 50℃, the top of the furnace shall not exceed 70℃, and the surface temperature of various thermal equipment, thermal pipelines and valves shall not exceed 50℃.
(3) The boiler shall be managed and operated according to GB/T17954-2000 "Economic Operation of Industrial Boilers". When the boiler is running, the fuel designed by the boiler or the fuel similar to the designed fuel should be selected. The air distribution should be reasonable during the operation, and the pressure, temperature and water level should be kept stable. The boiler operation should be in the range of safe and stable operation. The range of safe and stable operation should be controlled in the range of 80% ~ 100% of the rated working condition. In order to ensure economic operation, the heating surface of the boiler should be cleaned regularly and kept clean. Safety and effectiveness must be ensured when using ash remover or power purging. During the operation of the boiler, the tightness of the smoke duct, furnace wall and furnace door equipment should be checked frequently. Leakage should be repaired in time if found. It should also clear the ash in time where it is easy to accumulate. Pipes, valves, instruments and thermal insulation structures should be regularly checked to ensure that they are tight, intact and timely eliminate running, bubming, dripping, leakage and other phenomena. The fuel consumption meter, steam and water flowmeter, pressure gauge, thermometer and other instruments equipped with the boiler to reflect the economic operation state of the boiler must be used within the verification cycle, and should be checked, corrected and maintained regularly according to the provisions.

XI、Stop the furnace

Boiler stop is generally divided into two cases:

a、automatic stop furnace:

(1) When the steam pressure rises to the first overpressure protection value, the burner is automatically closed. At this time the boiler is still in the running state, will still automatically start. (There are also set to fire to small fire)
(2) When the steam pressure rises to the second overpressure protection value, the burner automatically closes. At this time, the burner will not start automatically, and it must be reset.

b、Manually stop the furnace

In the operation of the boiler, when one of the following situations occurs, the boiler should be stopped immediately and the relevant departments should be notified.
(1) The boiler water level is lower than the bottom visible edge of the water level gauge;
(2) Increased water supply and other measures were taken, but the water level continued to drop;
The water level of the boiler exceeds the highest visible water level (full water), and the water level can not be seen after water discharge;
(4) Feed water pump all failure or feed water system failure, can not to the boiler water;
⑸ water level gauge or safety valve all fail;
⑹ All pressure gauges installed in the steam space fail;
⑺ Boiler components damaged and crisis to the operation personnel;
The collapse of the furnace wall or the burning of the boiler frame pose a serious threat to the safe operation of the boiler;
(9) Other abnormal conditions endanger the safe operation of the boiler;
Emergency manual stop the furnace should focus on preventing the expansion of the accident, the specific steps are "manual" → "small fire" → "stop the furnace".

XII、Maintenance

The following points should be paid attention to during the operation of the boiler:

(1) Boiler feed water and boiler water monitoring

The water quality of the feed water and furnace water of the boiler shall comply with the provisions of GB/T1576-2018 Standard of Industrial Boiler Water Quality. And regular sampling tests. The quantity and frequency of discharge shall be determined by laboratory personnel. Detailed records shall be made of laboratory tests and sewage discharge.

(2) Monitoring of rotating machinery

For the water pump, fan, oil pump and so on to use a look two listen three touch method for monitoring. Find abnormal phenomenon, namely take measures to deal with. When necessary to stop the furnace maintenance, are not careless.

(3) Monitor oil level of daily fuel tank

If there is no oil level automatic control device, the oil level should be checked regularly. If the oil level is found to be too low to use for 2 hours, please inform the fuel personnel in advance to inject new fuel.

(4) Water level control of soft water tank

Automatic control is generally adopted

⑸ Running state of water treatment equipment

To regularly check the water treatment equipment in the ion exchange agent is invalid, or regular backwash.

⑹ Smoke temperature monitoring

Under normal circumstances, the exhaust temperature of the new boiler is generally low, and it will gradually rise with the increase of the operation time. If the change is found to be too big and more than 20℃ (the difference), you should choose the appropriate time to stop the furnace and ash. If this phenomenon occurs frequently, it is necessary to check whether the combustion system is normal. If the oil pressure is too low, the oil temperature is too low so that poor atomization, or the wind oil ratio is not right, resulting in poor oil and gas mixing and oxygen combustion and carbon analysis.

In addition, for dry back boiler, if the exhaust temperature increases suddenly, it is possible to leak smoke between the second return of the smoke box of the firewall, it is necessary to stop the furnace repair.

Boiler operation 2 ~ 3 weeks, should be checked once. Mainly check the valve, pipe flange, etc., if there is leakage should be repaired. Every 3 to 6 months after boiler operation, the boiler should be shut down for comprehensive inspection and maintenance. In addition to the above 2 items, the following work should be carried out:

(1) Remove scale and sludge inside the drum, and wash it with clean water.

(2) To check the boiler inside and outside, such as the welding seam of the compression part, whether there is corrosion inside and outside the steel plate. If found serious defects should be repaired as soon as possible. If the defect is not serious, it can also be left for the next shutdown repair. If there is anything suspicious but does not affect production safety, records should be made for future reference.

(3) After inspection, boiler paint can be applied on the water surface to prevent corrosion. Boiler base should be painted at least once a year.

Boiler long-term maintenance method: there are two dry method and wet method, stop the furnace for more than a month should use dry maintenance method, stop the furnace for less than a month can use wet maintenance method.

(1) Dry maintenance method:

After the boiler is stopped, put the boiler water, completely remove the internal dirt, rinse, dry in the furnace with a small fire (pay attention not to fire), and then put the 10 ~ 30mm block of quicklime in the tray, put it in the cylinder, do not make the lime

contact with the metal, the weight of quicklime powder, calculated with the cylinder volume of 8kg per cubic meter, Then close all manholes, hand holes and pipe valves, check once every three months, if the quicklime is crushed into powder, it must be replaced immediately, and the quicklime and dish should be taken out when the boiler is running again.

(2) Wet maintenance method:

After the boiler is shut down, the water is released, the internal dirt is completely removed, washed clean, and the treated water is re-injected to the full, the furnace water is heated to 100℃, so that the gas in the water is discharged out of the oven, and then all the valves are closed. Wet maintenance can not be used in cold climates, in order to avoid damage to the boiler after freezing water.

IV、Troubleshooting Common Faults

I、The oil burner fault causes and troubleshooting methods

In case of failure, check first whether the correct operation requirements are met:
1, check whether the wire is electric;
2, check whether there is oil supply;
3. Check whether all controllers are adjusted properly.
If not caused by the above reasons, check according to the following table.

So the barrier	The original for	Ruled out measures
1. No ignition	Ignition electrode gap is too large Ignition electrode contaminated or moist There is something wrong with the burner controller Insulator cracking Charring ignition cable	Adjustment of the Clean and adjust it Replacement of the Replacement of the Replace, find out the cause, repair
2. The burner motor cannot be started	Overload trip There is something wrong with the contactor There is something wrong with the burner motor	Check the given value replace replace

3. Mechanical noise occurs when the oil pump does not supply oil	Gear damage Suction valve leaks The oil pipe is leaking The cut-off valve is closed Filter blockage There is something wrong with the pressure control valve Reduced flow Air in pump The vacuum in the pump tubing is too high	replace Remove for cleaning or replacement Tighten the joint Open the Cleaning of the Replace the pump Replace the pump Tighten the joint Clean the strainer and open all the valves
4, nozzle atomization is not uniform, no oil flow nozzle leakage	The cyclone is loose Orifice (orifice) partially blocked Filter blockage Wear and tear Nozzle clogging The nozzle closing mechanism is defective	Remove the nozzle and tighten the swirl plate Remove the cleaning Remove the cleaning replace Remove the cleaning replace
5. The burner controller with flame sensor has no reaction to the flame Interrupt lock light in running sequence	The flame receptors are blackened The temperature is too high and the damage is caused by overload Faulty flame	Clean the replace Check wiring and voltage reset
6, the burning head is polluted by oil or serious carbon deposition	The given value is incorrect Burning head is not correct Nozzle size wrong The amount of air burned is wrong The boiler room is not ventilated enough	correction replace replace Readjust the burner The boiler room must be ventilated through permanent openings. The cross-sectional area of the opening must equal more than 50% of the cross-sectional area of the device's chimney

Ⅱ、Gas burner fault causes and troubleshooting methods

When a fault occurs, you must first check whether the prerequisites for normal operation are met:

1. Whether there is electricity;
2. Whether the gas pressure on the gas supply network is correct and whether the ball valve is opened;
3. Whether all the regulators are adjusted correctly;
4. Whether the amount of gas and gas passing through the combustion space is changed.

If it is determined that the fault is not due to any of the above causes, the function related to the burner must be tested. To find the fault, remove the interlock and switch on the burner. The working process must be observed accurately, and most of the possible problems can be quickly identified and eliminated (see table below). The microammeter and the U-tube barometer should be attached to the inspection.

So the barrier		The cause of the problem	Elimination method
General failure	Burner motor does not run	There is no voltage Fuse damage Zero interrupt The motor failure Control circuit interruption Interruption of gas transmission Ball valve closed Controller failure	Connected to circuit replace repair replace Find the disconnect point and switch on or off the regulator or monitor Open the ball valve, in the long time the gas volume is insufficient, notify the gas management agency to replace
Air shortage	The burner motor runs, but stops after pre-purge Burner motor runs, but stops after about 20 seconds (only for equipment with sealing test device) The burner motor runs, but stops in the pre-purged state after 10 seconds	Air pressure switch malfunction Pressure switch contaminated, pipe blocked The solenoid valve is not sealed Pressure switch contacts not connected to running gear (air pressure is too low) The blower is contaminated The burner motor is rotating in the wrong direction	replace clean Exclude unsealed cases Adjust the pressure switch correctly and replace it if necessary clean The power pole changing

Ignition failure	The burner motor runs, the voltage is applied to the controller terminal 16, no ignition, later failure stop	The distance between ignition electrodes is too large The ignition electrode or circuit is grounded Ignition transformer failure	Regulating electrode spacing Remove grounding and replace damaged electrodes or cables Replace ignition transformer
Flame not formed	The motor runs and fires normally, but later fails and stops In equipment with a sealing test device The burner motor runs and fires normally, but stops later (Fault free display)	The solenoid valve is not open because the solenoid valve line valve is damaged or the cable is broken The solenoid valve is not sealed Filter blockage	Replace the solenoid valve or remove the fault that the current is blocked Exclude unsealed cases Clean or replace
Stop after flame formation	Flame formation, but shut down under high operation under rated load	Filter contaminated Gas meter failure or deep pipe water	Clean filter Notify the gas authority
Failure of flame monitoring during ionization	The burner motor runs, the ignition can be heard, the flame forms normally, but then the malfunction stops	Ionization current unstable, too low Improper air mixing regulation The ignition spark affects the ionization current The UV probe is stained The light is too weak	Change the position of the ionization electrode; Eliminate high environmental resistance in ionization circuit and terminal (tighten terminal) Readjust (see Debugging) Replace phase line and

		Uv probe malfunction	center line of ignition transformer primary coil Cleaning (degreasing) Test combustion regulation replace

III、Common faults and troubleshooting of safety accessories and valves

a、Common faults and troubleshooting methods of pressure gauge

Pressure gauge common fault is the pointer does not move, the pointer back to less than zero, pointer jitter, surface fuzzy or water drops appear.

1. The pointer does not move

Cause analysis and elimination methods	Elimination method
1.The cock is not open or in the right position. 2.The channel of cock, pressure gauge steam pipe or trap pipe is blocked. 3.The pointer is loose with the center axis or the pointer is stuck. 4.The welding leakage of spring elbow and table seat. 5.Sector gear and pinion gear are loose and disengaged	1.Unscrew the cock or adjust to the correct position. 2.Clean the pressure gauge, blow the channel, replace the cock or pressure gauge if necessary. 3.Tighten the pointer on the central axis, or eliminate the pointer stuck phenomenon. 4.Repair welding reference leakage. 5.Overhaul the sector gear and pinion to make them mesh.

2. the pointer back to less than zero

Cause analysis	Elimination method
1.Permanent deformation of the spring elbow loses elasticity. 2.The gossamer on the center wheel loses elasticity or falls off. 3.The passage of the cock, pressure gauge or trap is blocked. 4.The pointer and the central axis are loose, or the pointer is stuck	1.Replace the pressure gauge. 2.Replace the spring or reinstall it. 3.Cleaning the pressure gauge, blowing the channel, if necessary, the cock or pressure gauge should be replaced. 4.Tighten the pointer on the central axis, or eliminate the pointer stuck phenomenon.

3. The pointer jitter

Cause analysis	Elimination method

1.Gossamer damage. 2.The activity of the joint bolt between the free end of the spring elbow and the connecting rod or the joint bolt between the connecting rod and the sector gear is affected. When the elbow expands and moves, the sector gear shakes. 3.The two ends of the central axis are bent, and the two ends of the axis are rotated with different centers. 4.The passage of cock or trap is locally blocked. 5.There is dirt or rust in the transmission mechanism such as pinion, sector gear or shaft. 6.It is affected by surrounding vibrations.	1.repair gossamer. 2. Repair the joint bolt. 3.Replace the pressure gauge. 4.Blowing and washing channel. 5.Clean the pressure gauge. 6.Eliminate the vibration factor.

4. Water drops appear on the inner surface of the glass

Cause analysis	Elimination method
1.There is no rubber gasket at the joint of the glass surface and the shell, or the gasket is damaged, so that the joint surface is not sealed well. 2.The welding joint of spring elbow and table seat has leakage. 3.The spring bend has cracks.	1.Install or replace the rubber gasket. 2.Repair welding leakage. 3.Replace the pressure gauge.

b、water table common faults and troubleshooting methods

Water table common faults are cock leakage, water level sluggish, glass plate (pipe) in the water level is higher than the actual water level and glass tube burst and so on.

1.cock leakage

Cause analysis	Elimination method
1.The cock material or processing is defective. 2.The contact surface between the plug core and the plug seat is worn or corroded. 3.The packing is insufficient or metamorphic, and the filling pressure is not uniform.	1.Replace the cock. 2.Grind or replace the cock. 3.Add or replace the packing and tighten the packing gland

2. The water level is dull and motionless

Cause analysis	Eliminate stress
1.The water pipe or water cock is blocked by scale, packing, etc. 2.The water cock was closed by mistake.	1.Rinse the water pipe and water cock, or dredge with fine wire. 2.Turn the water cock.

3. The water level in the glass plate (tube) is higher than the actual water level

Cause analysis	Elimination method
1.The steam cock is blocked by the packing. 2.The steam cock was closed by mistake. 3.The furnace water foams because of high alkalinity.	1.Flush steam cock. 2.Open the steam cock. 3.Strengthen pollutant discharge.

4. glass tube burst

Cause analysis	Elimination method
1.The glass quality is not good, or in the cutting pipe caused by pipe end crack. 2.The center line of the upper and lower water level gauge socket is skewed. 3.After the replacement of new glass tube is not preheated. 4.The hot glass tube is suddenly splashed with cold water or the tube surface is contaminated with oil. 5.when installing, the expansion gap or packing is not pressed too tight	1.Replace the glass tube. 2.The center line of the upper and lower tube seat into a straight line. 3.Operate according to procedures. 4.prevent the glass tube quench, remove oil pollution. 5.Reserve expansion gap and press the packing appropriately.

c、Common faults and troubleshooting methods of safety valve

Safety valve common faults are long-term steam leakage (water), more than the specified pressure value has not opened or less than the specified pressure value on the open, and exhaust steam (water) after the spool does not return to the seat and so on.

1. Steam leakage (water)

Cause analysis	Elimination method
1.The valve core and valve seat close surface with scale, sand or attachments. 2.Wear of spool and seat. 3.Stem bending deformation or valve core	1.Blow the safety valve. If the effect is not obvious after blowing and washing, the safety valve should be opened after stopping the furnace, and the attachment

and seat support surface deflection. 4.Spring safety valve spring permanent deformation, lose the original elasticity. 5.The lever type safety valve lever and fulcrum deflection, so that the valve core and seat stress uneven.	should be removed. 2.Replace the spool and seat, or rework. 3.Replace stem or readjust level. 4.Replace the spring. 5.Adjust the center line of lever, strictly straight.

2. Do not exhaust steam (water) when the specified pressure is reached

Cause analysis	Elimination method
1.Spool and seat are stuck or rusted. 2.The gap between the stem and the shell is too small, and the stem is stuck after being heated and expanded. 3.The adjustment or improper maintenance, so that spring safety valve spring contraction is too tight, lever safety valve hammer and fulcrum between the distance is too long, static weight safety valve cast iron plate is too heavy. 4.The valve passage is blocked by blind plate and other obstacles.	1.Blow the safety valve. In serious cases, the valve core and valve seat should be ground after stopping the furnace. 2.Properly increase the clearance between the valve stem and the shell. 3.Readjust the safety valve. 4.Remove obstacles.

3. Exhaust steam (water) when the specified pressure is not reached

Cause analysis	Elimination method
1.Adjustment or improper maintenance, so that the spring safety valve spring pressure degree is not enough, lever safety valve hammer and fulcrum distance is too short, the weight of the pig iron plate of the static weight safety valve is not enough. 2.The spring is permanently deformed and the elastic force is weakened	1. Readjust the safety valve. 2. Replace the spring.

4. exhaust steam (water) after the valve core does not return to the seat

Cause analysis	Elimination method
1.The spring is bent. 2.The valve stem and spool are not installed in the right position or stuck.	(1) Replace the spring. (2) Reinstall the relief valve.

d、Common faults and handling of valves

1.the valve leakage, the reason is:

(1) The joint surface of the valve core and the seat is corroded, worn, scratched or dirty bonding.
(2) The packing is not compacted, uneven or metamorphic.
(3) The gasket is not pressed or has deteriorated.
(4) The degree of bolt tightness is different, so that the valve body and valve cover pressure is not tight.

2.the stem does not move, the reason is:

① The packing is pressed too much and too tight.
② The screw on the stem and bonnet is damaged.
③ Stem bending deformation, or due to corrosion is stuck.
④ The hand wheel is damaged, can not drive the valve stem.
⑤ The ram is stuck.

3.the valve body is broken, the reason is:

(1) The material is not good, there are holes, pores, or in the casting eccentric, so that the local strength is reduced.
② The valve is collided with small cracks, and the cracks expand after continued use.
③ When tightening the screw, the screw hole has been damaged and not found.
④ The valve body memory water is frozen and cracked.
⑤ The cast iron valve is installed with strong force, which is cracked due to uneven stress.
The solution is to repair or replace according to the actual cause.

IV、Possible pump faults and their solutions faults

	Possible cause	The solution
1, the pump does not absorb water, pressure gauge and vacuum table pointer pulsate violently.	Water injection pump is not enough, water pipe and instrument leakage.	Pour water into the pump and tighten to plug the leakage.
2. The pump does not absorb water, and the vacuum gauge indicates the high vacuum.	The bottom valve is not opened or blocked, the suction pipe resistance is too big, the suction height is too high.	Adjust or change the bottom valve condition, or change the suction pipe to reduce the suction height

3. The pressure gauge is under pressure, but the water pump still does not come out.	The outlet pipe resistance is too big, the rotation direction is wrong, the impeller is blocked, and the pump speed is not enough.	Check or shorten the water pipe and check the motor cleaning impeller, increase the pump shaft speed.
4, the flow is lower than the design requirements.	The pump is blocked, the sealing ring is worn too much, and the speed is insufficient	Clean the pump and pipe, replace the seal ring, increase the speed of the pump.
5, the power consumption of the pump is too large.	Packing gland is too tight, impeller wear, pump water supply increased.	Loosen packing gland, replace impeller, increase pipe resistance to reduce flow.
6, the pump internal sound abnormal, the pump does not water.	Flow is too large, suction pipe resistance is too large, air leakage in the suction place, the suction liquid temperature is too high.	Increase the resistance in the outlet pipe to reduce the flow, check the pump suction pipe, check the bottom valve, reduce the suction height, plug the leakage place, reduce the water absorption temperature.
7, pump vibration.	Pump shaft and motor shaft are not on the same center line.	Align the shaft center of the pump and motor.
8, bearing overheating.	There is no oil in the bearing, and the pump and the motor shaft are not on the same center line.	Oil, align shaft centerline, check or clean bearing body.

Said Ming

1. When the user needs to inquire the technical information about the boiler from the manufacturer, the contract and general drawing number should be explained.
2, for the boiler manufacturing quality query, should indicate the boiler number (on the boiler nameplate).
3. If the boiler is transferred, all technical documents must be handed over at the same time.