# GREENER WORLD, BLUER SKY


**Continental Hope Group**

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希望深蓝

# Utral Low NOx
# Vacuum Hot Water Boiler

**Hope Deepblue**

**Chinese Construction Energy Conservation and Emission Reduction Enterprise**
**Top 10 Chinese Trusted Brands**
**Top 10 in the Most Influential Brand in Chinese HVAC Industry Member of China Leading Group of Carbon Dioxide Emissions&Carbon Neutrality in Refrigeration&Air-conditioning**

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## 立足中国 服务全球
## Based on China
Service All Over The World

# Hope Deepblue Air Conditioning Manufacture Corp.,Ltd.

Hope Deepblue Air conditioning Manufacture Co.,LTD., founded in 1997, is a national key high-tech enterprise invested by Continental Hope Group. The company, located in the national key high-tech development zone Chengdu High-tech West Zone, is an absorption chiller& heat pump equipment production base in western China, is a member of China Leading Group of Carbon Dioxide Emissions&Carbon Neutrality in refrigeration&air conditioning. The company is committed to the research and development, production, sales and service in the field of absorption chiller, heat pump, industrial waste heat utilization, "one-stop"system solutions. The company mainly produces lithium bromide absorption chiller, heat pump, central vacuum hot water unit, which have been exported to many countries and regions. "Deepblue Green Energy Center", conducted by Hope Deepblue, the first combined cooling, heating and power system with independent intellectual property rights in China, has been running safely and stably since 2003. It is one of the most mature and reliable distributed energy system with the longest stable operation in China.

The company, known as “Waste Heat Utilization Expert”, has a strong technical advantage, a nationwide marketing, service network. Its products have won widely recognition in the HAVC, power plant, heating plant, coking, textile, pharmaceutical, chemical, food, and other industrial fields.

The company's products have obtained a large number of patents, proprietary technology, national industrial product production license. It has passed IS09001 International Quality System Certification, ISO14001 Environmental System Certification, OHSAS18001 Occupational Health and Safety Management System Certification, CE Certification, CCC National Mandatory Product Certification, CRAA Certification, CSC Energy-saving Product Certification, Disinfection Product Enterprise Hygienic License and other certifications. It has won the Gold Medal of China Science and Technology Expo and the Gold Medal of China Patent Technology Expo. Moreover, it has been included in the National Torch Plan Project, National Key New Product Project, China Energy Conservation Project Construction Key Recommended Units, Top 10 in the Most Influential Brand Chinese HVAC Industry, Top 10 in the Most Trusted National Brand among Chinese Designers, the China Building Energy Conversation and Emission Reduction Model Enterprise, the Leading Enterprise in the field of waste heat recovery in China, the Special Contribution Award in the field of building environment and equipment.

PRODUCTION VALUE


# QUALIFICATIONS
## AND HONORS

## Hope Deepblue - create value for customers

■ **Operation safety**

Negative pressure operation,no danger of explosion,
create a conception of using boiler safety.

■ **Low NOx emission**

All indicators meet the national requirements,
the emission of NOx are less than 30mg/Nm$^3$

■ **Low operation cost**

Integrated design of vacuum hot water boiler, meet the energy conservation efficiency in heating supply;
Higher efficiency than steam boiler, less heat waste, no need for heat exchange;
Average operation cost : 5% energy saving compared with ordinary hot water boiler system.

■ **Investment saving**

Using life span more than 25 years, it is the double working life of ordinary boiler.


Business License


High-tech Enterprise

Group of Carbon Dioxide Emissions&Carbon Neutrality in Refrigeration&Air-conditioning


Chinese Construction Energy Conservation and Emission Reduction Enterprise

Top 10 in HVAC industry

Top 10 Most Trusted Brands by Designers

National Torch Program


CE Certification

ISO9001 Certification

ISO14001 Certification

ISO45001 Certification

# MANUFACTURE FACILITY

## ▼ 生产设备

# FACTORY VIEW

## ▼ 园区掠影

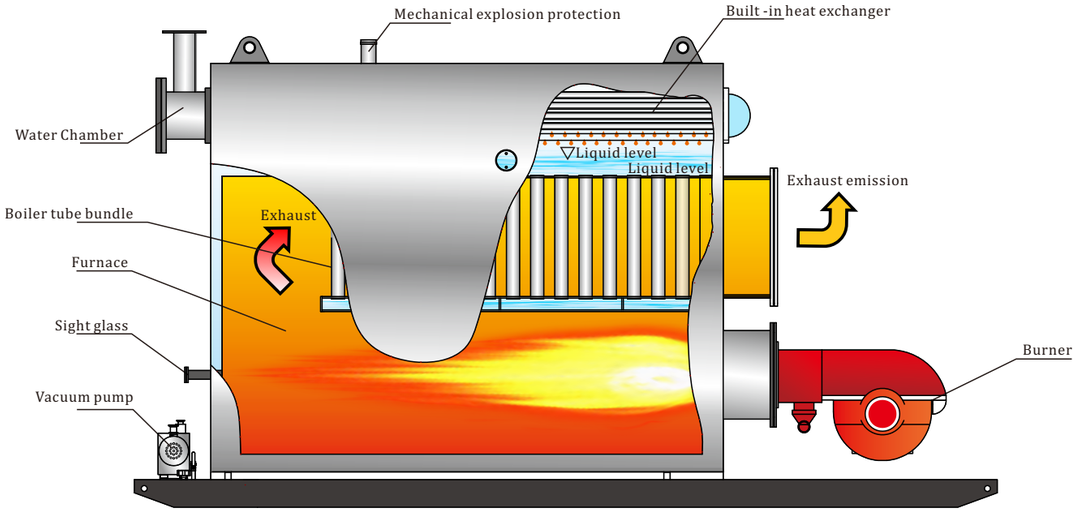



# TESTING FACILITY

## 检测设备

# DIAGRAM

## ▼ 工作原理图




# WORKING PRINCIPLE

## ▼ 工作原理

Central vacuum water boiler, also known as vacuum phase change boiler, is the use of water at different pressure, the corresponding boiling temperature of different characteristics to work. At atmospheric pressure (one atmosphere), the boiling temperature of water is 10°C, while at 0.008 atmospheric pressure, the boiling temperature of water is only 4°C.

According to this characteristic of water, the vacuum hot water boiler works in the vacuum degree of 130mmHg~690mmHg and the corresponding boiling temperature of water is 56°C ~97°C. When the vacuum hot water boiler works under the working pressure, the burner heats the medium water on and makes it temperature rising to meet saturation and evaporation.

The water in the heat exchanger tubes, which are inserted boiler, become hot water by absorbing the outside heat of water vapor, then the vapor are condensed into water and be heated again, thus completing the entire heating cycle.

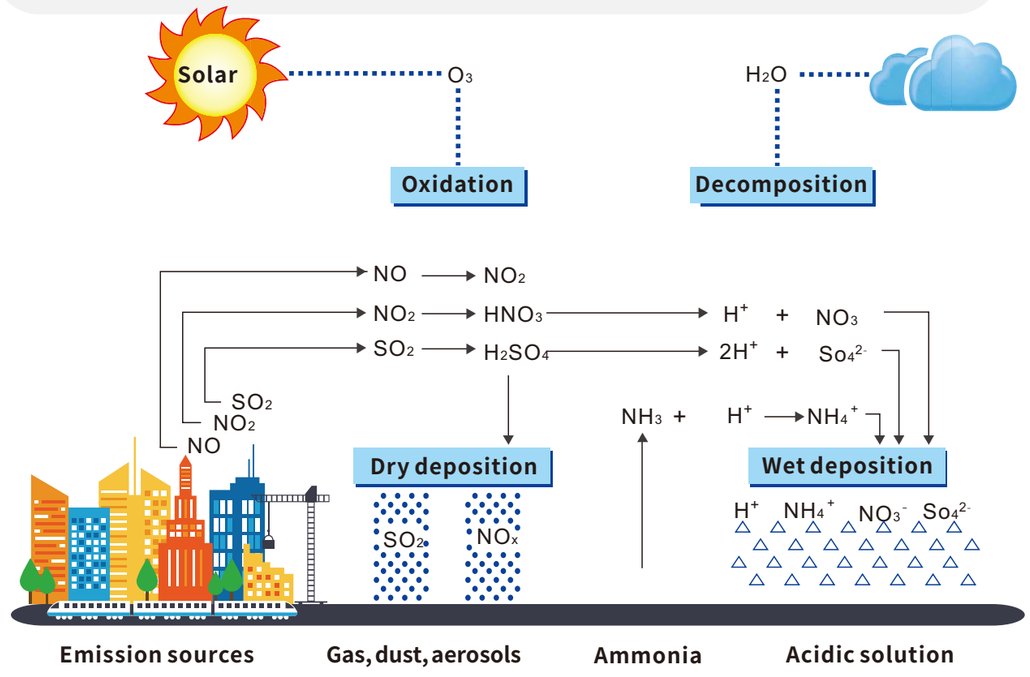


# LN TECHNOLOGY

## ▼ 低氮燃烧技术

**Ⅰ. The formation and hazards of NOx**

During the combustion process of oil and gas , it produces nitrogen oxides, the main components of which are nitric oxide (NO) and nitrogen dioxide (NO2), collectively known as NOx. NO is colorless and odorless gas, insoluble in water. It accounts for more than 90% of all NOx formed during high temperature combustion, and is not highly toxic or irritating when its concentration ranges from 10-50 PPm. NO2 is brownish-red gas that is visible even at low concentrations and has a distinctive acidic odor. It is strongly corrosive and can irritate the nasal membranes and eyes at concentrations of nearly 100 ppm even only remaining a few mins in the air, and it can cause bronchitis at concentrations of up to 150 ppm and pulmonary edema at concentrations of up to 500 ppm.




Cycle diagram of air pollution caused by NOx

II. **Formation of NOx During Combustion**

There are 3 ways to form NOx according to the causes.

1. Thermodynamic type NOx

Nitrogen in the combustion air is oxidized at high temperatures (T > 1500 K) and high oxygen concentrations. Most gaseous fuels (e.g. natural gas and LPG) and general fuels that do not contain nitrogen compounds produce NOx in this way. Thermal NOx in the Exhaust increases dramatically when flame temperatures is above 1200℃. This is the main control item for NOx low-NOx combustion.

2. Instant type NOx

Formed in the flame region by the interaction of hydrocarbons (CHi radicals) formed with nitrogen in the combustion air. This method of forming NOx is very fast. This NOx can only be produced when the oxygen concentration is relatively low. And therefore, it's not a significant source in gas combustion.

3. Fuel type NOx

The production of fuel-based NOx depends on the nitrogen contained in the fuel. When the nitrogen content of the fuel exceeds 0.1%, the production is already considerable, especially for liquid and solid fuels. Natural gas and LPG does not produce this type of NOx.

III. **The main measures to reduce NOx emission value**

1. When low NOx emission are required, adopt natural gas as fuel instead of liquid or solid fuel.

2. Lower NOx emissions by increasing the size of the furnace to reduce combustion intensity

The relationship between combustion intensity and furnace size.

$$\text{Combustion intensity} = \frac{\text{Burner output power[Mw]}}{\text{Furnace Volume[m}^3\text{]}}$$

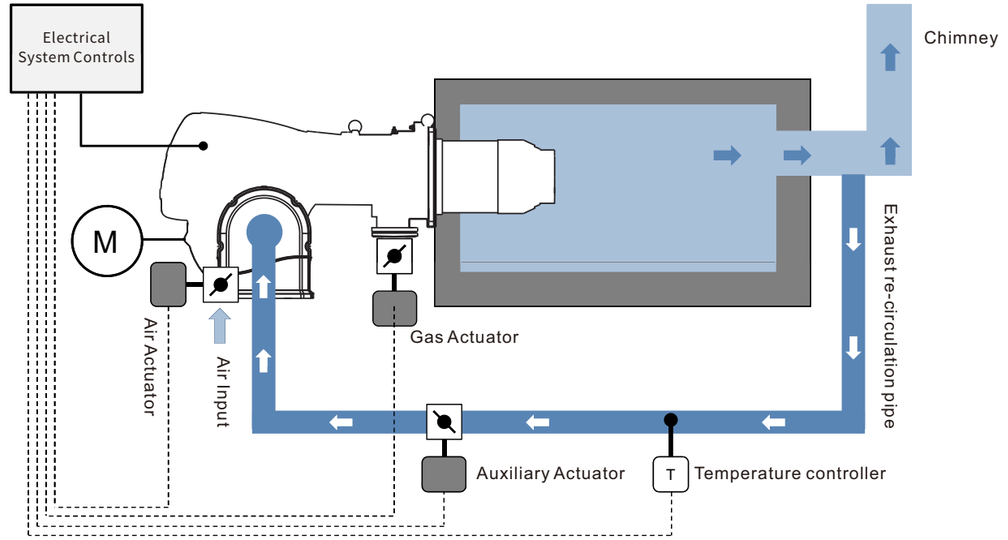
The higher the combustion intensity in the furnace, the higher the temperature inside the furnace, which directly affects the NOx emission value. Therefore, in order to reduce the combustion intensity in the case of a certain burner output power, it is necessary to increase the furnace volume (i.e., increase the size of the furnace membrane).t concentrations of up to 150 ppm and pulmonary edema at concentrations of up to 500 ppm.

3. Adopt advanced ultra-low NOx burner

1) The low NOx burner adopts electronic proportional adjustment and oxygen content control technology, which can precisely control the burner to meet the low NOx emission requirements under different working conditions.

2) Adopt ultra low NOx burner with FGR external Exhaust circulation combustion technology

FGR external Exhaust circulation combustion, from the flue to extract part of the low-temperature Exhaust and combustion air mixed in the combustion head, which reduces the oxygen concentration in the hottest flame area, slow down the combustion speed, result in a lower flame temperature. When the Exhaust reaches a certain amount of circulation, the temperature of the furnace is reduced, which suppresses the generation of NOx.



# 冷凝真空热水机组

## CONDENSATE VACUUM HOT-WATER CENTRAL HEATING SYSTEM

### ▼ 冷凝真空热水机组：

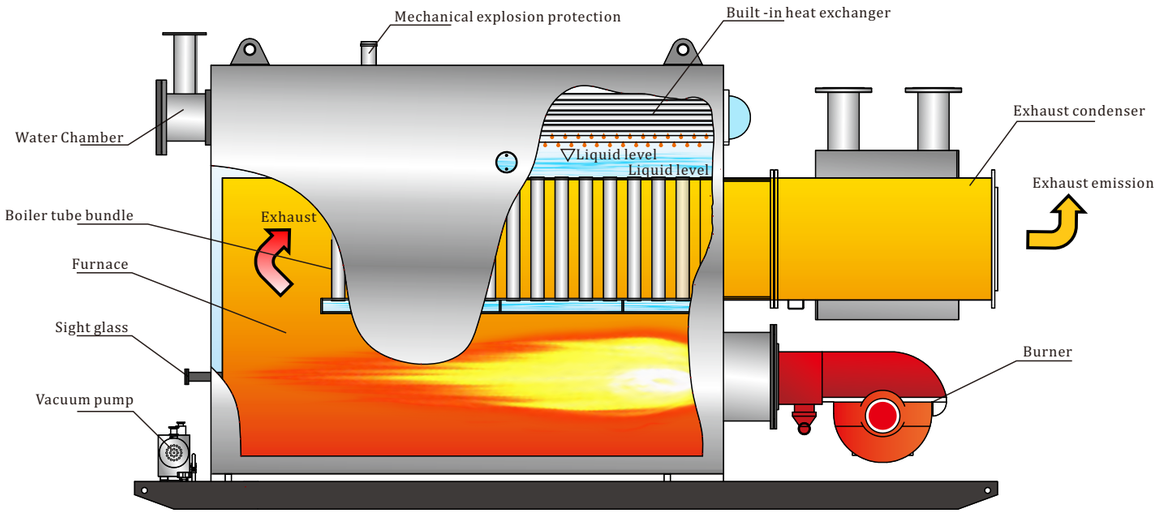
With the reduction of non-renewable energy sources, the rising of energy prices and increasing attention of energy conservation and environmental protection in China, Hope Deepblue has successfully developed a condensate low NOx vacuum hot water boiler, whose efficiency can reach 104%. Condensate vacuum hot water boiler adds a Exhaust condenser on standard vacuum hot water boiler to recycle the sensible heat from exhaust gas and the latent heat from water vapour, so it can reduce the Exhaust emission temperature and recycle the heat to heat the circulating water of boiler, improving efficiency of boiler evidently.

The higher vapor content in the Exhaust, the more heat is released from condensation.

Natural gas is mainly composed of CH4 (methane), containing high H content, combustion produces a large amount of water vapor, so the condensate boiler is generally based on natural gas fuel.

## CONDENSATE DIAGRAM

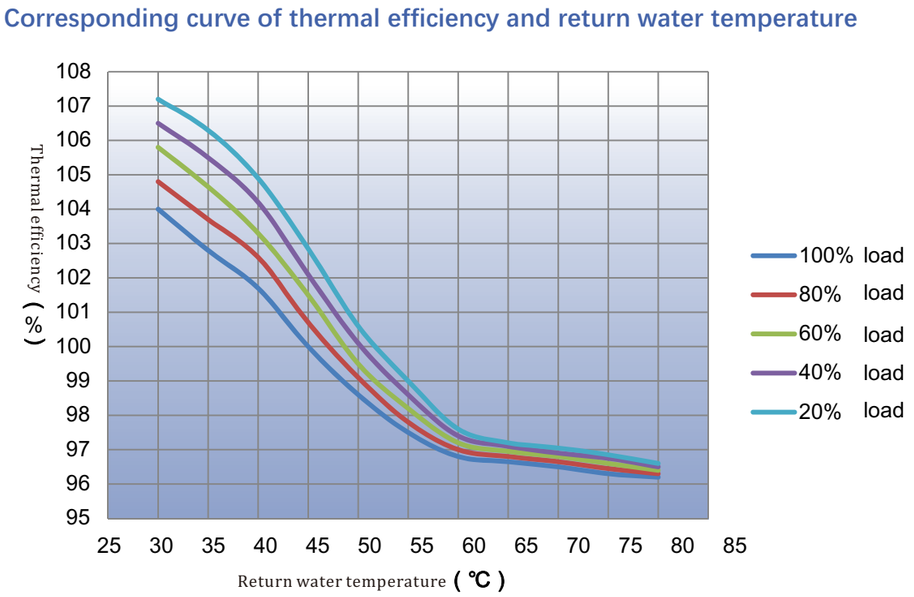
### ▼冷凝锅炉工作原理图：






## CONDENSATE EFFICIENCY GRAPH

### ▼ 冷凝锅炉效率曲线图：




Note:

1. When the circulating water temperature is lower than 55°C, exhaust gas condensation occurs in condensate boiler.
2. The lower the return water temperature, the higher the thermal efficiency of the boiler.
3. The lower the operating load of the boiler, the higher the thermal efficiency.
4. Exhaust condensate water is weakly acidic, it is better to drain water away in the machine room and use of stainless steel chimney.

# PRODUCT FEATURES

## ▼ 机组特点

**Negative pressure operation, reliable and safe**

Boiler always works under a negative pressure without the risk of expansion and explosion. After installation, there is no need to be supervised and inspected by the boiler pressure organization, and there is no need to review the operation qualification.

**Phase-change heat transfer, more efficient**

The unit is a wet back type water pipe structure vacuum phase change heat, heat transfer intensity is large. The thermal efficiency of the boiler is as high as 94%~104%.

**Built-in heat exchanger, multi-functions**

The central vacuum water boiler can provide multiple loops and different temperatures of hot water, to meet the users' heating, domestic hot water, swimming pool heating and other hot water demands, and can also provide process water for kinds of industrial and mining enterprises. Built-in heat exchanger can support higher pipe pressure, and can supply heating hot water and domestic hot water to high-rise building directly. It is not necessary to install another heat exchanger.

**Closed circulation, longer life span**

The furnace has a certain degree of vacuum and the heat medium water is soft water. The heat medium steam conduct indirect heat transferring with the hot water in built-in heat exchanger pipes, the heat medium cavity will not be scaling, the furnace body will not corrode.

**Automatic control system, easy operation**

The hot water temperature can be set freely within the range of E90°C. The microcomputer PID control can automatically adjust the energy according to the heat load, to control the hot water at setting temperature. Timed on/off, no need to guard, and user can observe the current hot water temperature and other parameters.

**Multiple safety protection, operation status monitoring**

The boiler sets a lot of safety protection devices, such as hot water temperature too high protection, heat medium temperature too high protection, heat medium water antifreeze protection, boiler overpressure protection, liquid level control, etc, The fault is automatically alarmed, so that the danger of overpressure and dry burning will never occur. The control system has a perfect self-test function, when there is an abnormality in the boiler, the burner automatically stops working and shows the fault point, which provides a clue for troubleshooting.

**Remote monitoring, BAC Building Control**

The reserved RS485 communication interface can realize the user's demand for remote monitoring, group control and BAC control of the boiler.

**Environmental-friendly combustion, exhaust emission clean**

Adopting wide furnace design, equipped with imported ultra-low NOx burner with automatic stepless regulation function makes the combustion safe, exhaust clean, and all indicators meet the most stringent national requirements, especially NOx emission≤ 30mg/Nm$^3$.

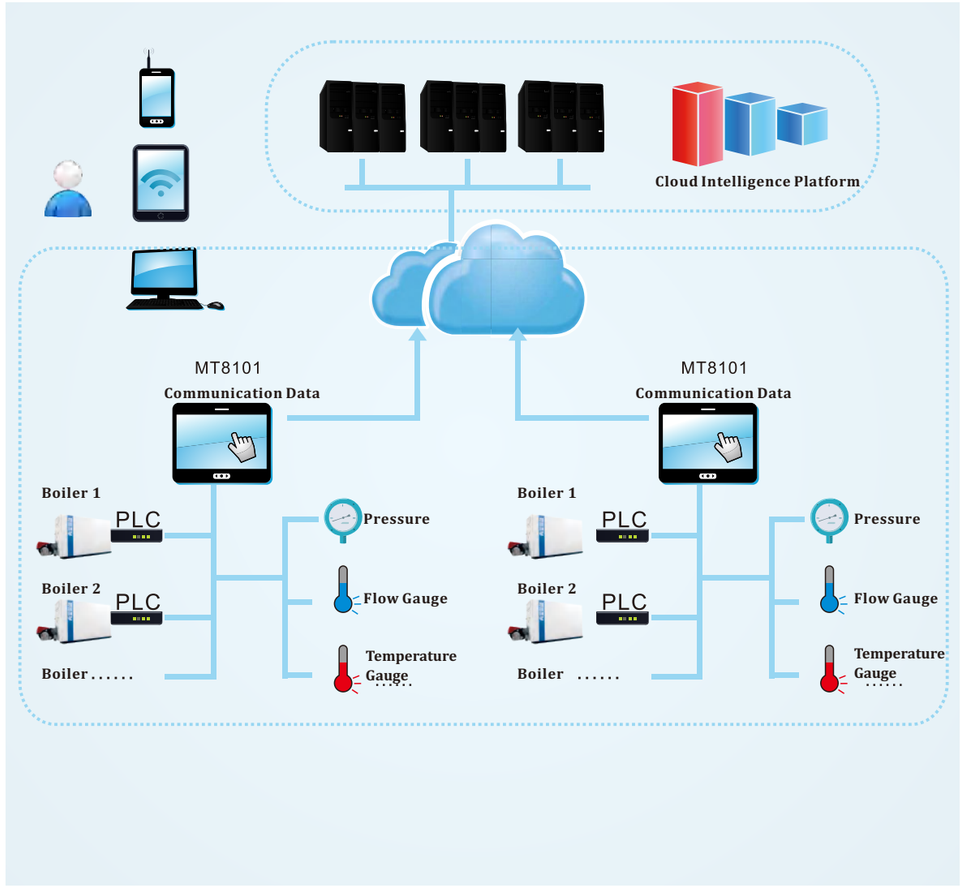


# Global Remote Operation and Maintenance System (Optional function)

## ▼ 全球远程运维系统 (特殊订货)

Hope Deepblue Remote Monitoring Center summarizes its distributed boiler data from all over the world. And through the classification, statistics and analysis of real time data, and displaying them in the form of reports, curves and bar charts, it achieves the overall control of unit operation status and fault information.

With a series of collection, calculation and control, alarm and early warning, unit ledger, unit operation and maintenance information and other functions, as well as the combination of customized special analysis and displaying functions, ultimately realize the remote operation, maintenance and management of the boiler needs. Authorized clients can access the system by browsing the WEB page or cell phone APP, which is convenient and fast.



# Product Model Description

Z 1.16 K (0.7) N (0.24) W (0.22) - Y - D3

- Special symbols: D3 indicates NOx≤30mg/Nm³, D8 indicates NOx≤80mg/Nm³, L indicates condenser.
- Gas Y - Light oil, T - Gas, R- Artificial gas. When omitted, it indicates natural gas.
- Domestic hot water power consumption: 0.22Mw. If there are multiple loops, it is indicated as (X-X-X...).
- Domestic hot water inlet/outlet temperature: W indicates inlet/outlet temperature 40/65 °C, and the rest is indicated as (X/X).
- Radiator hot water pipe power consumption: 0.24Mw, If there are multiple loops, which are expressed as (X-X-X...).
- Radiator hot water inlet/outlet temperature: N indicates inlet/outlet temperature of 60/85 °C, and the rest is indicated as (X/X).
- Fan coil hot water power consumption: 0.7Mw. If there are multiple loops, it is indicated as (X-X-X...).
- Fan coil hot water inlet/outlet temperature: K indicates inlet/outlet temperature of 50/60 °C, and the rest is indicated as (X/X).
- Nominal thermal power: Mw, it indicates 1.16Mw here.
- Z - vacuum hot water boiler, C - normal pressure hot water boiler.

*Bluer sky*

*Less pollution*

科技改变生活·环保带来希望
Technology changes life
Green creates hope

**NOx is one of the main reasons for the formation of haze. Facing with increasingly severe environmental problems, more strict environmental standards are set across the whole countries. Low NOx emissions becomes the tendency in the future.**

# ILLUSTRATION

## 说明:

- The low calorific values of the fuels consumption: light oil 10400Kcal/kg , natural gas 8600Kcal/Nm and artificial gas 4200 Kcal/Nm% .The fuel consumption of different calorific value can be calculated according to the following formula: Actual fuel consumption = fuel consumption*low calorific value of fuel / actual low calorific value. (Reference table data)
- The nominal working pressure of the standard model hot water boiler is 1.0MPa. Specify the special request when ordering, if the working pressure is more than 1.0MPa,
- The outlet temperature of hot water can be set freely according to the actual needs, and the max. outlet temperature of vacuum hot water boiler is 90°C.
- The unit is standard equipped with one loop of hot water, specify the request when ordering if multiple circulating hot water are required. The sum of multiple circulating hot water output thermal power is equal to the total output thermal power of the boiler.

## Vacuum /atmospheric pressure hot water boiler nominal parameter

| Model Z/C | | | | 0.12 | 0.23 | 0.35 | 0.47 | 0.58 | 0.7 | 0.81 | 0.93 | 1.05 | 1.16 | 1.4 | 1.74 | 2.1 | 2.33 | 2.8 | 3.49 | 4.2 | 4.88 | 5.58 | 6.28 | 6.98 | 10.47 | 13.96 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal power | | kW | | 120 | 233 | 349 | 465 | 581 | 700 | 814 | 930 | 1050 | 1163 | 1400 | 1745 | 2100 | 2326 | 2791 | 3489 | 4187 | 4884 | 5583 | 6280 | 6978 | 10467 | 13956 |
| | | $10^4$kcal/h | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 150 | 180 | 200 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 900 | 1200 |
| Radiator (60→85°C) | Flow | $m^3/h$ | | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 48 | 60 | 72 | 80 | 96 | 120 | 144 | 168 | 192 | 216 | 240 | 360 | 480 |
| | Pipe diameter | DN(mm) | | 32 | 50 | 50 | 65 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 125 | 125 | 125 | 150 | 150 | 200 | 200 | 200 | 250 | 250 | 250 | 300 |
| | Pressure drop | kPa | | 35 | 26 | 26 | 35 | 41 | 41 | 61 | 61 | 25 | 25 | 38 | 38 | 38 | 61 | 74 | 74 | 110 | 20 | 31 | 31 | 31 | 89 | 107 |
| Fan coil (50→60°C) | Flow | $m^3/h$ | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 150 | 180 | 200 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 900 | 1200 |
| | Pipe diameter | DN(mm) | | 40 | 65 | 80 | 80 | 100 | 100 | 125 | 125 | 125 | 125 | 150 | 150 | 200 | 200 | 200 | 250 | 250 | 250 | 300 | 300 | 300 | 400 | 450 |
| | Pressure drop | kPa | | 39 | 57 | 57 | 27 | 13 | 13 | 20 | 20 | 28 | 28 | 41 | 41 | 41 | 67 | 80 | 80 | 120 | 22 | 33 | 33 | 33 | 96 | 114 |
| Domestic hot water (40→65°C) | Flow | $m^3/h$ | | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 48 | 60 | 72 | 80 | 96 | 120 | 144 | 168 | 192 | 216 | 240 | 360 | 480 |
| | Pipe diameter | DN(mm) | | 32 | 50 | 50 | 65 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 125 | 125 | 125 | 150 | 150 | 200 | 200 | 200 | 250 | 250 | 250 | 300 |
| | Pressure drop | kPa | | 35 | 26 | 26 | 35 | 41 | 41 | 61 | 61 | 25 | 25 | 38 | 38 | 38 | 61 | 74 | 74 | 110 | 20 | 31 | 31 | 31 | 83 | 96 |
| Fuel consumption | Light oil | Consumption | kg/h | 10.2 | 20.5 | 30.7 | 40.9 | 51.1 | 61.4 | 71.6 | 81.8 | 92.1 | 102.3 | 122.7 | 153.4 | 184.1 | 204.6 | 245.5 | 306.9 | 368.2 | 429.6 | 491.0 | 552.4 | 613.7 | 920.6 | 1227.5 |
| | | Pipe connection | DN(mm) | 25 | | | | | | | | | | | | | | | | | | | | | | |
| | Natural gas | Consumption | $Nm^3/h$ | 12.4 | 24.7 | 37.1 | 49.5 | 61.9 | 74.2 | 86.6 | 99.0 | 111.3 | 123.7 | 148.4 | 185.6 | 222.7 | 247.4 | 296.9 | 371.1 | 445.3 | 519.5 | 593.8 | 668.0 | 742.2 | 1113.3 | 1484.4 |
| | | Pipe connection | DN(mm) | 32 | 32 | 32 | 32 | 40 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 125 | 125 | 125 | 150 |
| | Coal gas | Consumption | $Nm^3/h$ | 25.3 | 50.7 | 76.0 | 101.3 | 126.6 | 152.0 | 177.3 | 202.6 | 228.0 | 253.3 | 304.0 | 379.9 | 455.9 | 506.6 | 607.9 | 759.9 | 911.9 | 1063.8 | 1215.8 | 1367.8 | 1519.8 | 2279.6 | 3039.5 |
| | | Pipe connection | DN(mm) | 32 | 32 | 40 | 40 | 50 | 50 | 65 | 65 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 100 | 125 | 125 | 125 | 150 | 150 | 150 | 150 |
| Power supply | | kW | | 0.7 | 0.7 | 0.7 | 0.75 | 1.4 | 1.4 | 1.8 | 1.8 | 1.8 | 2.6 | 2.6 | 5.5 | 5.5 | 9 | 9 | 9 | 14 | 17 | 17 | 25 | 25 | 45 | 55 |
| Electrical power | | | | 3Φ/380V-50Hz | | | | | | | | | | | | | | | | | | | | | | |
| Ship weight | | t | | 0.6 | 0.9 | 1.3 | 1.6 | 1.9 | 2.1 | 2.2 | 2.3 | 2.5 | 2.6 | 3 | 3.5 | 4.1 | 4.5 | 5.4 | 6.9 | 8 | 9.7 | 11.9 | 14.1 | 16.7 | 25.2 | 32.3 |
| Operation weight | | | | 0.8 | 1.2 | 1.7 | 2.1 | 2.4 | 2.8 | 3 | 3.1 | 3.5 | 3.7 | 4.3 | 5 | 5.7 | 6.6 | 7.9 | 10 | 11.7 | 13.5 | 15.7 | 17.8 | 20.1 | 30.7 | 39.7 |
| Heat medium water charge | | | | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 | 1.2 | 1.4 | 1.6 | 2 | 2.3 | 2.6 | 2.9 | 3.2 | 4.8 | 6.4 |



## Utral low NOx vacuum /atmospheric pressure hot water boiler nominal parameter

| Model Z( )D / C( )D | | | | 0.12 | 0.23 | 0.35 | 0.47 | 0.58 | 0.7 | 0.81 | 0.93 | 1.05 | 1.16 | 1.4 | 1.74 | 2.1 | 2.33 | 2.8 | 3.49 | 4.2 | 4.88 | 5.58 | 6.28 | 6.98 | 10.47 | 13.96 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal power | | kW | | 120 | 233 | 349 | 465 | 581 | 700 | 814 | 930 | 1050 | 1163 | 1400 | 1745 | 2100 | 2326 | 2791 | 3489 | 4187 | 4884 | 5583 | 6280 | 6978 | 10467 | 13956 |
| | | $10^4$kcal/h | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 150 | 180 | 200 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 900 | 1200 |
| Radiator (60→85°C) | Flow | $m^3/h$ | | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 48 | 60 | 72 | 80 | 96 | 120 | 144 | 168 | 192 | 216 | 240 | 360 | 480 |
| | Pipe diameter | DN(mm) | | 32 | 50 | 50 | 65 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 125 | 125 | 125 | 150 | 150 | 200 | 200 | 200 | 250 | 250 | 250 | 300 |
| | Pressure drop | kPa | | 35 | 26 | 26 | 35 | 41 | 41 | 61 | 61 | 25 | 25 | 38 | 38 | 38 | 61 | 74 | 74 | 110 | 20 | 31 | 31 | 31 | 89 | 107 |
| Fan coil (50→60°C) | Flow | $m^3/h$ | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 150 | 180 | 200 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 900 | 1200 |
| | Pipe diameter | DN(mm) | | 40 | 65 | 80 | 80 | 100 | 100 | 125 | 125 | 125 | 125 | 150 | 150 | 200 | 200 | 200 | 250 | 250 | 250 | 300 | 300 | 300 | 400 | 450 |
| | Pressure drop | kPa | | 39 | 57 | 57 | 27 | 13 | 13 | 20 | 20 | 28 | 28 | 41 | 41 | 41 | 67 | 80 | 80 | 120 | 22 | 33 | 33 | 33 | 96 | 114 |
| Domestic hot water (40→65°C) | Flow | $m^3/h$ | | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 48 | 60 | 72 | 67 | 96 | 120 | 144 | 168 | 192 | 216 | 240 | 360 | 480 |
| | Pipe diameter | DN(mm) | | 32 | 50 | 50 | 65 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 125 | 125 | 125 | 150 | 150 | 200 | 200 | 200 | 250 | 250 | 250 | 300 |
| | Pressure drop | kPa | | 35 | 26 | 26 | 35 | 41 | 41 | 61 | 61 | 25 | 25 | 38 | 38 | 38 | 61 | 74 | 74 | 110 | 20 | 31 | 31 | 31 | 83 | 96 |
| Fuel consumption | Natural gas | 耗量 | $Nm^3/h$ | 12.4 | 24.7 | 37.1 | 49.5 | 61.9 | 74.2 | 86.6 | 99.0 | 111.3 | 123.7 | 148.4 | 185.6 | 222.7 | 247.4 | 296.9 | 371.1 | 445.3 | 519.5 | 593.8 | 668.0 | 742.2 | 1113.3 | 1484.4 |
| | | 口径 | DN(mm) | 32 | 32 | 32 | 32 | 40 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 125 | 125 | 125 | 150 |
| Power supply | | kW | | 0.51 | 0.51 | 2.2 | 2.2 | 2.2 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 7.5 | 7.5 | 15 | 15 | 15 | 22 | 22 | 22 | 28 | 28 | 55 | 75 |
| Electrical power | | | | 3Φ/380V-50Hz | | | | | | | | | | | | | | | | | | | | | | |
| Ship weight | | t | | 1.5 | 1.6 | 1.8 | 2 | 2.3 | 2.6 | 2.7 | 2.8 | 3 | 3.2 | 3.8 | 4.5 | 5 | 5.9 | 7.3 | 8.6 | 10 | 12.4 | 15.4 | 18.7 | 23 | 34.5 | 43.5 |
| Operation weight | | | | 1.9 | 2.1 | 2.3 | 2.5 | 3 | 3.4 | 3.6 | 3.9 | 4.2 | 4.5 | 5.3 | 6.1 | 7.1 | 8.4 | 10.4 | 12.3 | 13.7 | 16.1 | 19.3 | 22.9 | 27.8 | 41.3 | 52.4 |
| Heat medium water charge | | | | 0.3 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 | 0.9 | 1 | 1.2 | 1.3 | 1.4 | 2.2 | 2.3 | 2.5 | 3 | 3.4 | 3.9 | 4.3 | 6.4 | 8.5 |

## Condensate vacuum/atmospheric pressure hot water boiler nominal parameter

| Model Z( )L / C( )L | | | | 0.12 | 0.23 | 0.35 | 0.47 | 0.58 | 0.7 | 0.81 | 0.93 | 1.05 | 1.16 | 1.4 | 1.74 | 2.1 | 2.33 | 2.8 | 3.49 | 4.2 | 4.88 | 5.58 | 6.28 | 6.98 | 10.47 | 13.96 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal power | | kW | | 120 | 233 | 349 | 465 | 581 | 700 | 814 | 930 | 1050 | 1163 | 1400 | 1745 | 2100 | 2326 | 2791 | 3489 | 4187 | 4884 | 5583 | 6280 | 6978 | 10467 | 13956 |
| | | $10^4$kcal/h | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 150 | 180 | 200 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 900 | 1200 |
| Fuel consumption | Light oil | Consumption | kg/h | 9.7 | 19.4 | 29.1 | 38.9 | 48.6 | 58.3 | 68.0 | 77.7 | 87.4 | 97.1 | 116.6 | 145.7 | 174.8 | 194.3 | 233.1 | 291.4 | 349.7 | 407.9 | 466.2 | 524.5 | 582.8 | 874.1 | 1165.5 |
| | | Pipe connection | DN(mm) | 25 | | | | | | | | | | | | | | | | | | | | | | |
| | Natural gas | Consumption | $Nm^3/h$ | 11.7 | 23.5 | 35.2 | 47.0 | 58.7 | 70.5 | 82.2 | 94.0 | 105.7 | 117.5 | 140.9 | 176.2 | 211.4 | 234.9 | 281.9 | 352.4 | 422.8 | 493.3 | 563.8 | 634.2 | 704.7 | 1057.1 | 1409.4 |
| | | Pipe connection | DN(mm) | 32 | 32 | 32 | 32 | 40 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 125 | 125 | 125 | 150 |
| | Coal gas | Consumption | $Nm^3/h$ | 24.1 | 48.1 | 72.2 | 96.2 | 120.3 | 144.3 | 168.4 | 192.4 | 216.5 | 240.5 | 288.6 | 360.8 | 432.9 | 481.0 | 577.2 | 721.5 | 865.8 | 1010.1 | 1154.4 | 1298.7 | 1443.0 | 2164.5 | 2886.0 |
| | | Pipe connection | DN(mm) | 32 | 32 | 40 | 40 | 50 | 50 | 65 | 65 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 100 | 125 | 125 | 125 | 150 | 150 | 150 | 150 |
| Model Z( )DL / C( )DL | | | | 0.12 | 0.23 | 0.35 | 0.47 | 0.58 | 0.7 | 0.81 | 0.93 | 1.05 | 1.16 | 1.4 | 1.74 | 2.1 | 2.33 | 2.8 | 3.49 | 4.2 | 4.88 | 5.58 | 6.28 | 6.98 | 10.47 | 13.96 |
| Nominal power | | kW | | 120 | 233 | 349 | 465 | 581 | 700 | 814 | 930 | 1050 | 1163 | 1400 | 1745 | 2100 | 2326 | 2791 | 3489 | 4187 | 4884 | 5583 | 6280 | 6978 | 10467 | 13956 |
| | | $10^4$kcal/h | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 150 | 180 | 200 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 900 | 1200 |
| Fuel consumption | Natural gas | Consumption | $Nm^3/h$ | 11.7 | 23.5 | 35.2 | 47.0 | 58.7 | 70.5 | 82.2 | 94.0 | 105.7 | 117.5 | 140.9 | 176.2 | 211.4 | 234.9 | 281.9 | 352.4 | 422.8 | 493.3 | 563.8 | 634.2 | 704.7 | 1057.1 | 1409.4 |
| | | Pipe connection | DN(mm) | 32 | 32 | 32 | 32 | 40 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 65 | 65 | 80 | 80 | 100 | 100 | 100 | 125 | 125 | 125 | 150 |

# 外形尺寸

## Vacuum/atmospheric pressure hot water boiler dimension

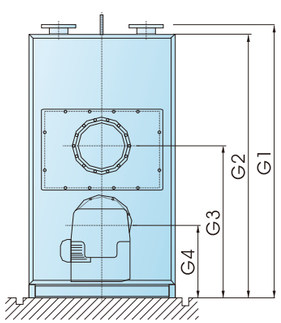
| Z/C | 0.12 | 0.23 | 0.35 | 0.47 | 0.58 | 0.7 | 0.81 | 0.93 | 1.05 | 1.16 | 1.4 | 1.74 | 2.1 | 2.33 | 2.8 | 3.49 | 4.2 | 4.88 | 5.58 | 6.28 | 6.98 | 10.47 | 13.96 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | 1600 | 1970 | 2205 | 2380 | 2600 | 3030 | 3055 | 3080 | 3153 | 3225 | 3360 | 3740 | 3845 | 4007 | 4700 | 4900 | 5630 | 5800 | 6250 | 6700 | 7150 | 8682 | 9082 |
| L2 | 1000 | 1370 | 1595 | 1780 | 2005 | 2165 | 2195 | 2220 | 2295 | 2365 | 2510 | 2865 | 2970 | 3130 | 3480 | 3700 | 4300 | 4475 | 4866 | 5256 | 5650 | 7045 | 7445 |
| L3 | 780 | 900 | 1350 | 1540 | 1698 | 1910 | 1945 | 1978 | 2055 | 2137 | 2275 | 2600 | 2720 | 2875 | 3208 | 3448 | 4013 | 4220 | 4537 | 4854 | 5172 | 6545 | 6945 |
| W1 | 720 | 740 | 780 | 840 | 910 | 980 | 1005 | 1005 | 1100 | 1100 | 1200 | 1200 | 1300 | 1400 | 1500 | 1620 | 1676 | 1696 | 1866 | 2036 | 2204 | 2400 | 2600 |
| W2 | 375 | 375 | 500 | 500 | 600 | 600 | 600 | 600 | 630 | 670 | 670 | 670 | 670 | 670 | 700 | 700 | 760 | 820 | 820 | 900 | 900 | 900 | 900 |
| G1 | 1520 | 1615 | 1720 | 1725 | 1840 | 1965 | 1995 | 2026 | 2040 | 2050 | 2117 | 2349 | 2468 | 2538 | 2605 | 2770 | 2834 | 2892 | 3084 | 3276 | 3468 | 3960 | 4250 |
| G2 | 1440 | 1505 | 1666 | 1655 | 1770 | 1875 | 1900 | 1950 | 1950 | 1925 | 2040 | 2260 | 2390 | 2460 | 2520 | 2695 | 2743 | 2810 | 2959 | 3108 | 3256 | 3810 | 4100 |
| G3 | 820 | 850 | 964 | 978 | 1032 | 1024 | 1080 | 1130 | 160 | 1186 | 1270 | 1347 | 1417 | 1507 | 1558 | 1583 | 1649 | 1682 | 1806 | 1930 | 2052 | 2495 | 2650 |
| G4 | 355 | 365 | 400 | 425 | 452 | 510 | 460 | 468 | 500 | 526 | 583 | 615 | 655 | 655 | 655 | 690 | 737 | 762 | 805 | 848 | 890 | 1115 | 1180 |
| D1 | Φ220 | Φ220 | Φ280 | Φ280 | Φ335 | Φ335 | Φ385 | Φ385 | Φ385 | Φ385 | Φ440 | Φ465 | Φ515 | Φ515 | Φ565 | Φ625 | Φ665 | Φ665 | Φ800 | Φ896 | Φ950 | Φ1372 | Φ1542 |
| D2 | Φ195 | Φ195 | Φ255 | Φ255 | Φ310 | Φ310 | Φ360 | Φ360 | Φ360 | Φ360 | Φ415 | Φ440 | Φ490 | Φ490 | Φ540 | Φ600 | Φ640 | Φ640 | Φ760 | Φ856 | Φ915 | Φ1212 | Φ1382 |
| D3 | Φ162 | Φ162 | Φ221 | Φ221 | Φ277 | Φ277 | Φ328 | Φ328 | Φ328 | Φ328 | Φ380 | Φ405 | Φ455 | Φ455 | Φ505 | Φ565 | Φ605 | Φ605 | Φ720 | Φ812 | Φ880 | Φ1052 | Φ1222 |
| n | 8-Φ10 | 8-Φ10 | 8-Φ10 | 8-Φ10 | 10-Φ10 | 10-Φ10 | 12-Φ10 | 12-Φ10 | 12-Φ10 | 12-Φ10 | 14-Φ10 | 14-Φ10 | 14-Φ10 | 14-Φ10 | 16-Φ10 | 16-Φ10 | 16-Φ10 | 16-Φ10 | 16-Φ10 | 20-Φ10 | 20-Φ10 | 28-Φ10 | 28-Φ10 |

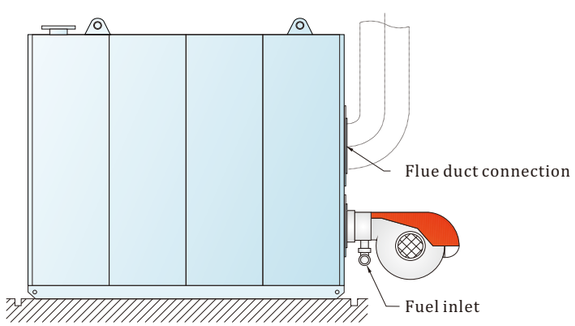
## Utral low NOx vacuum/ atmospheric pressure hot water boiler dimension

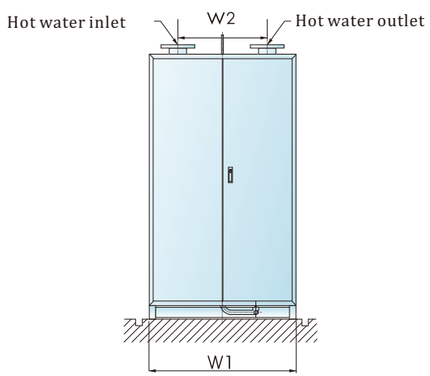
| ZD/CD | 0.12 | 0.23 | 0.35 | 0.47 | 0.58 | 0.76 | 0.81 | 0.93 | 1.05 | 1.16 | 1.4 | 1.74 | 2.1 | 2.33 | 2.8 | 3.49 | 4.2 | 4.88 | 5.58 | 6.28 | 6.98 | 10.47 | 13.96 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L1 | 2550 | 2820 | 2950 | 3050 | 3350 | 3500 | 3600 | 3680 | 3820 | 3950 | 4220 | 4800 | 5050 | 5150 | 5450 | 6080 | 6500 | 6920 | 7502 | 7841 | 8180 | 9982 | 10282 |
| L2 | 1600 | 1870 | 2000 | 2100 | 2400 | 2550 | 2650 | 2700 | 2870 | 3000 | 3250 | 3600 | 3860 | 3950 | 4250 | 4800 | 5200 | 5516 | 5945 | 6282 | 6620 | 7800 | 8232 |
| L3 | 1380 | 1650 | 1780 | 1880 | 1990 | 2280 | 2430 | 2480 | 2620 | 2750 | 3000 | 3320 | 3567 | 3650 | 3960 | 4440 | 4880 | 4930 | 5003 | 5434 | 5866 | 7100 | 7500 |
| W1 | 720 | 740 | 780 | 840 | 910 | 1005 | 1005 | 1005 | 1100 | 1100 | 1200 | 1300 | 1400 | 1400 | 1500 | 1620 | 1676 | 1841 | 2006 | 2094 | 2182 | 2400 | 2600 |
| W2 | 375 | 375 | 400 | 400 | 600 | 600 | 600 | 600 | 630 | 650 | 650 | 670 | 670 | 670 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 850 | 900 |
| G1 | 1620 | 1715 | 1820 | 1865 | 1980 | 2150 | 2180 | 2200 | 2210 | 2220 | 2406 | 2500 | 2654 | 2680 | 2780 | 2950 | 3020 | 3182 | 3356 | 3482 | 3608 | 4360 | 4660 |
| G2 | 1540 | 1605 | 1720 | 1750 | 1900 | 2050 | 2080 | 2110 | 2110 | 2120 | 2380 | 2410 | 2550 | 2580 | 2680 | 2850 | 2920 | 3072 | 3248 | 3359 | 3470 | 4220 | 4520 |
| G3 | 880 | 930 | 1030 | 1070 | 1150 | 1180 | 1230 | 1280 | 1300 | 1320 | 1423 | 1500 | 1522 | 1640 | 1710 | 1760 | 1790 | 1938 | 2087 | 2148 | 2210 | 2695 | 2850 |
| G4 | 445 | 455 | 465 | 485 | 510 | 530 | 555 | 580 | 600 | 620 | 673 | 720 | 750 | 780 | 780 | 800 | 830 | 936 | 1042 | 1077 | 1111 | 1165 | 1220 |
| D1 | Φ220 | Φ220 | Φ335 | Φ335 | Φ335 | Φ385 | Φ385 | Φ385 | Φ385 | Φ490 | Φ490 | Φ540 | Φ540 | Φ590 | Φ690 | Φ690 | Φ780 | Φ840 | Φ1114 | Φ1050 | Φ1060 | Φ1372 | Φ1542 |
| D2 | Φ195 | Φ195 | Φ310 | Φ310 | Φ310 | Φ360 | Φ360 | Φ360 | Φ360 | Φ465 | Φ465 | Φ515 | Φ515 | Φ465 | Φ675 | Φ675 | Φ755 | Φ810 | Φ1010 | Φ1020 | Φ1030 | Φ1212 | Φ1382 |
| D3 | Φ162 | Φ162 | Φ277 | Φ277 | Φ277 | Φ328 | Φ328 | Φ328 | Φ328 | Φ430 | Φ430 | Φ482 | Φ482 | Φ532 | Φ632 | Φ632 | Φ722 | Φ762 | Φ800 | Φ842 | Φ880 | Φ1052 | Φ1222 |
| n | 8-Φ10 | 8-Φ10 | 10-Φ10 | 10-Φ10 | 10-Φ10 | 12-Φ10 | 12-Φ10 | 12-Φ10 | 12-Φ10 | 14-Φ10 | 14-Φ10 | 14-Φ10 | 14-Φ10 | 16-Φ10 | 20-Φ10 | 20-Φ10 | 24-Φ10 | 24-Φ10 | 24-Φ10 | 24-Φ10 | 24-Φ10 | 28-Φ10 | 28-Φ10 |

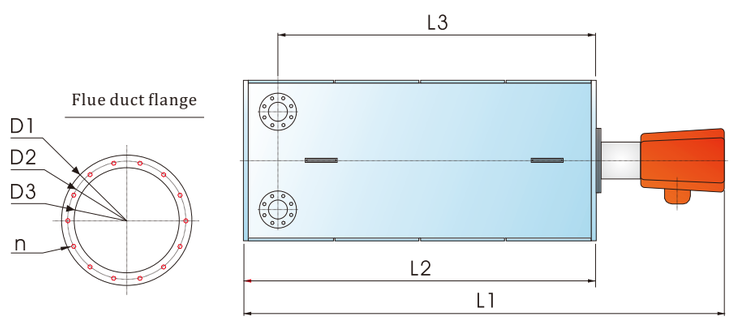
## ILLUSTRATION

### 说明:



# INSTALLATION GUIDE
# 安装指南

## GAS SYSTEM

### 燃气系统

- The design and construction of the gas system must conform to the current national standard “Code for Urban Gas Design” and “ Gas safety Regulation for Industrial Enterprises”.

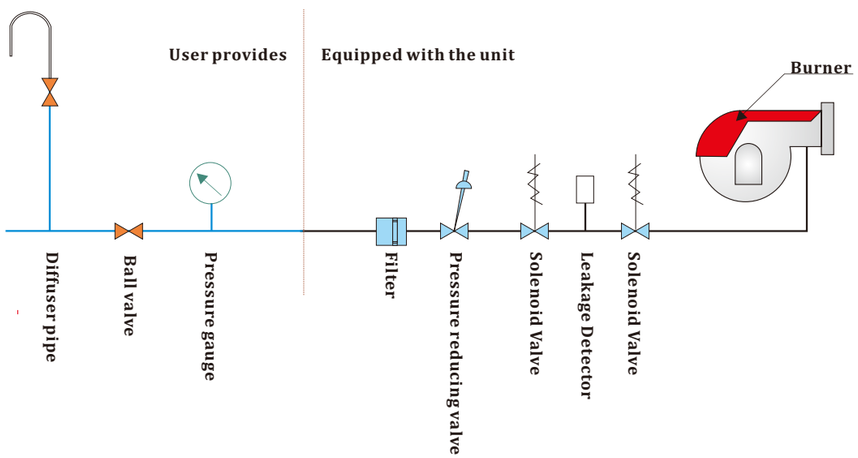
- The gas inlet pressure in burner should be within the following range.

| | Z( )DL 0.23~0.76 | Z( )DL 0.93~1.74 | Z( )DL 2.04~4.2 |
|---|---|---|---|
| **Natural gas** | 4～25 | 6～30 | 8～35 |

Unit：Kpa

- The gas inlet pipe of the burner should be installed with a gas diffuser pipe (connected to the outdoor), a ball valve, and a pressure gauge. (Range: 0～50KPa)

- The nominal diameter of the natural gas supply pipe shall be one size larger than the burner gas inlet diameter.






## EXHAUST SYSTEM

### 排烟系统

The exhaust gas temperature of central vacuum hot water boiler is 150°C.

Exhaust gas rate (m3/h) = heat output (kw)* 2.2 (m/kw·h).

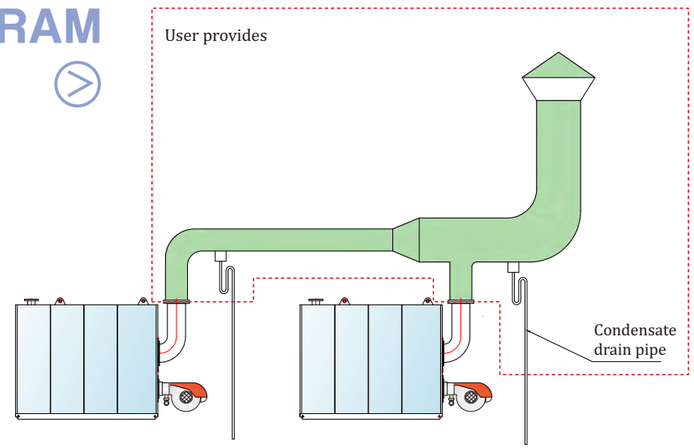
The flue structure should minimize the flow resistance. Central vacuum hot water boiler outlet exhaust pressure should be between -50～0Pa. Chimney hight should be higher than 0.6* horizontal flue length (m) plus 1.2 * flue elbow quantity (pcs).

The cross section of fuel gas pipeline should not be less than central vacuum hot water boiler exhaust gas pipeline cross section.The circulation cross section of the common chimney or exhaust chimney should not be less than the sum of the separate circulation cross section.

The chimney outlet must be equipped with a rain cap, lightning rod and windshield. The diameter of the chimney rain cap should be more than 500mm larger than the diameter of the chimney to ensure that rain will not drift into the chimney or boiler and cause corrosion of the flue pipe.

The bottom of the horizontal flue duct closest to the hot water vacuum boiler should be equipped with a water collection tank and condensate discharge pipe to discharge flue condensate and rain. The condensate drain pipe should have a U-shaped water-seal bend to prevent air from being sucked in unit, and condensate can not be discharged.

DIAGRAM
示意图

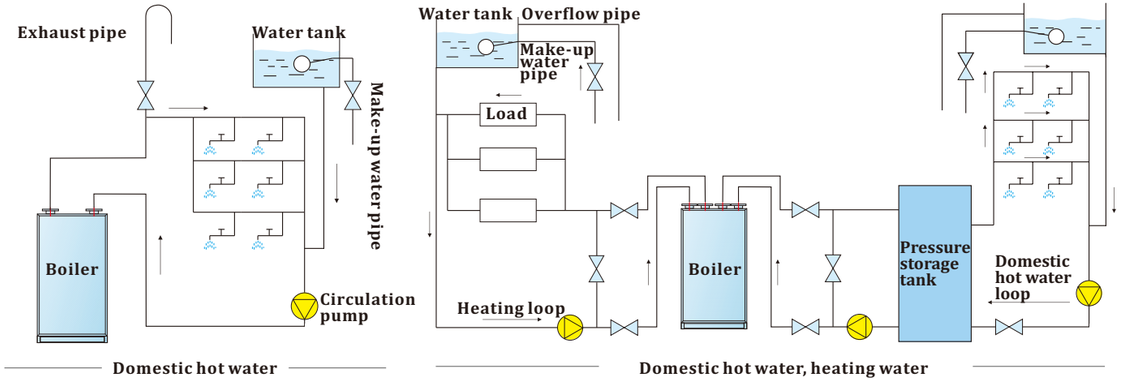


# MACHINE ROOM REQUIREMENTS
## 机房要求

The hot water vacuum boiler is free of vibration during the operation, so the foundation can be designed according to static load. The drainage grooves should be set up around the unit (depth: 50mm, width: 80mm) and the machine room must keep well ventilation.

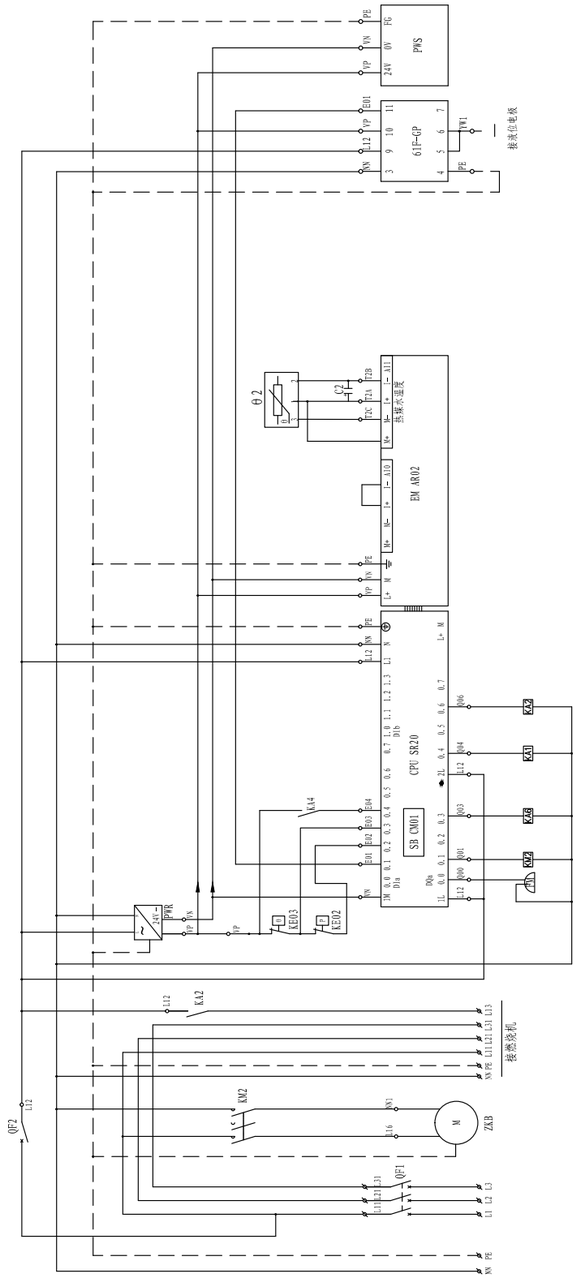
During operation the amount of air required for combustion (m/h) = 1.3( m3/KM·h) * heat output (KM)

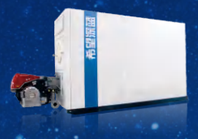
# DOMESTIC HOT WATER SYSTEM
## 生活热水系统




# INSTALLATION GUIDE
## 安装指南

# ELECTRIC SCHEME
## 电气原理图





## Vacuum hot water boiler selection table

**Please specify the following when ordering**
**Boiler type: vacuum hot water boiler (Z)/ atmospheric pressure hot water boiler (C)/ ultra low NOx vacuum hot water boiler (ZD).**
**Nominal thermal power:____*10⁴kcal/h or ____MW**

**Purpose**
**Radiator heating, hot water inlet/outlet temperature is ____°C/ ____°C**
**Fan coil heating, hot water inlet/outlet temperature is ____°C/ ____°C**
**Domestic hot water, hot water inlet/outlet temperature is ____°C/ ____°C**
**Other purpose:_____ , hot water inlet/outlet temperature is ____°C/ ____°C**

**NOx emission requirements**
**≤30mg/Nm³**
**≤80mg/Nm³**
**≤150mg/Nm³(National emission standard)**

**Fuels**
**Diesel fuel, Lower heat value is____kcal/Nm³, pressure is____Kpa**
**Natural gas, Lower heat value is____kcal/Nm³, pressure is____Kpa**
**Artificial gas, Lower heat value is____kcal/Nm³, pressure is____Kpa**
**Liquefied gas, Lower heat value is____kcal/Nm³, pressure is____Kpa**
**Other fuels: , Lower heat value is____kcal/Nm³, pressure is____Kpa**

**Special requirements**
**Provide two circuits of hot water. One circuit is used for____the heating power is____ *10⁴kcal/h.**
**The other is____, the heating power is____*10⁴kcal/h.**
**Use dual fuel burner. The successive fuels used are____and____ .**
**If the hot water pressure is higher than 1.0Mpa, the pressure is____MPa**
**Provide heat source water for water source heat pump, inlet /outlet temperature is____°C/____°C**

**Equipped with RS485 communication interface.**
**Equipped with exhaust condenser.**
**Equipped with remote remote operation&maintenance system**
**Other special requirements:**




## *AQSIQ Pot Letter No. 228 Clearly stipulated:*

国家质量监督检验检疫总局

国质检锅函[2002]288 号

关于实施《小型和常压热水锅炉安全技术监察规定》有关问题的通知

各省、自治区、直辖市质量技术监督局：

为更好地贯彻执行《小型和常压热水锅炉安全技术监察规定》（原国家质量技术监督局第11号令，以下简称《规定》），现就实施过程中的有关问题进一步明确如下：

一、关于茶水炉是否纳入安全监察的问题

二、关于民用水暖煤炉是否纳入安全监察的问题

三、关于燃气热水器（含快速和容积式两类）、电热水器与燃气锅炉、电加热锅炉的界定划分问题

四、关于小型蒸汽锅炉是否独立建造锅炉房问题

五、关于防止常压热水锅炉承压使用的问题

六、真空相变锅炉的管理

真空相变锅炉因其介质流通系统的压力低于大气压力，因而不会发生爆炸事故。制造企业应按标准制造真空相变锅炉，并且承担告知用户（含锅炉安装者）安全使用，保证使用时锅炉系统始终处于真空状态的法律责任。真空相变锅炉的安装单位对安装质量符合制造企业规定的安装要求负责。符合上述要求的真空相变锅炉安装后不必由质量技术监督行政部门锅炉压力容器安全监察机构进行确认，也不必办理使用登记注册手续。

特此通知。

中华人民共和国国家质量监督检验检疫总局

二〇〇二年五月二十日

主题词：锅炉 安全 监察 通知

国家质检总局办公厅 2002 年 5 月 20 日印发

录入：李 霞 校对：李 军





19th Asian Games
Hangzhou 2022

# REPRESENTATIVE PROJECTS

Nanjing Wanda Plaza
Oriental Hope Tianxiang Landmark
Chengdu Wenjiang Bayi Furniture City
Oriental Hope Center
Ningbo Marriott Hotel
Chongqing Lifan Red Star International Plaza
Suzhou Global 188 Mansion
Nanjing Red Sun Furniture & Decoration City
Changchun Eurasia Shopping Plaza
Beijing Elaine Hsuan Real Estate Style District
Sichuan Museum
Xi'an Shenglong Plaza
Xi'an Hilton Hotel
Wenzhou Stereo City Shopping Center
Western China International Expo City
Shanghai Hengrui Pharmaceutical Co.
Shandong Feicheng Yiwu International Trade City
Wuhan Friendship International Plaza
Haima Automobile Co.
Chengdu Jinniu District Government Affairs Center
Hunan Mobile
Diaoyutai Boutique Hotel
Wuhai General Times Square
Jiangsu Yancheng Development Zone Tianhe Photoelectric
Hangzhou SMIC Semiconductor
Yunnan Dianzhong Business Plaza
Anhui Huaibei People's Hospital
Hangzhou Asian Games Venue
CNOOC Offshore Engineering Equipment Manufacturing Base
Lhasa Shuangchuang Plaza
Qiqihar Oriental Hope