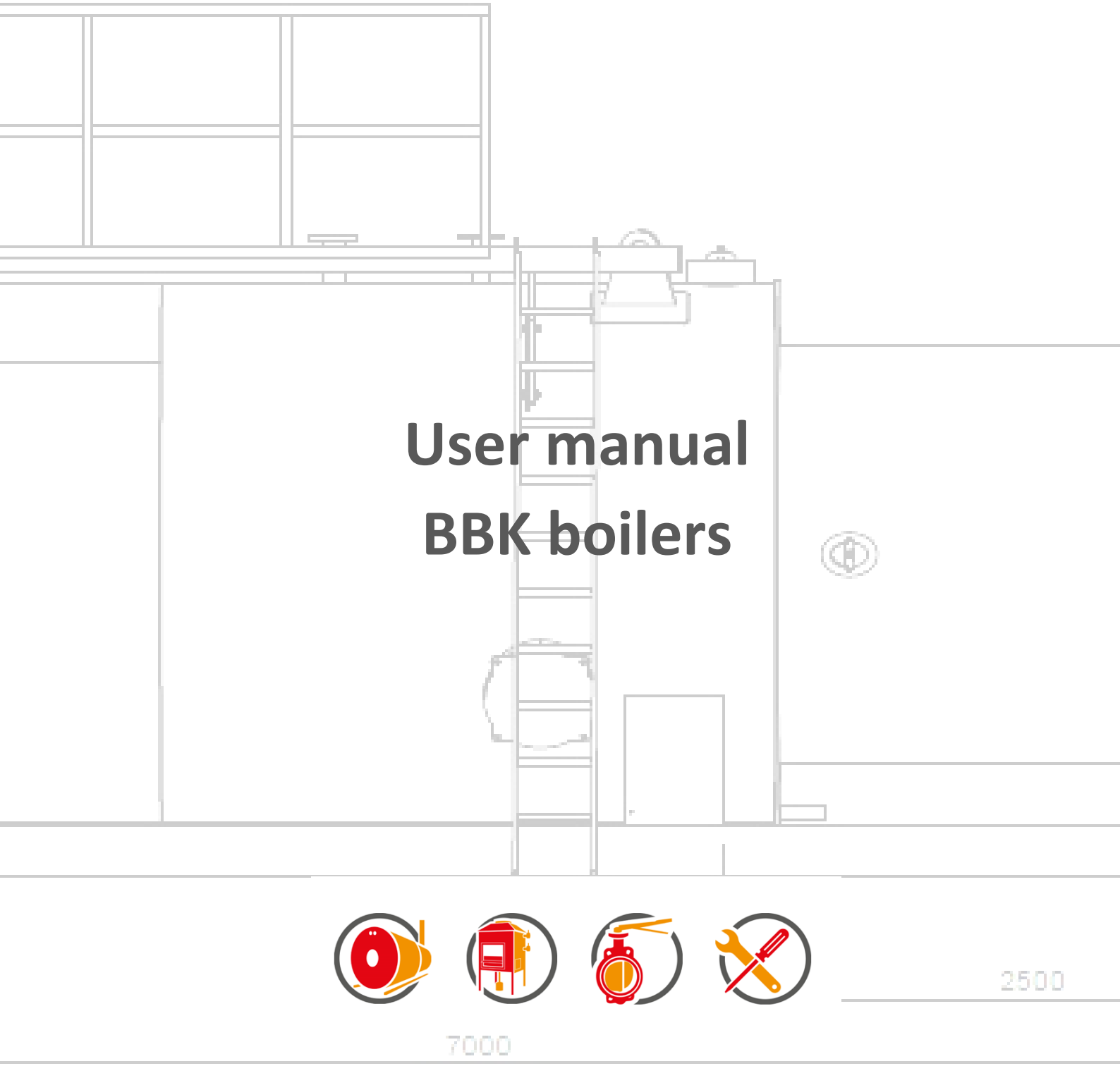

User manual
BBK boilers

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1.0 Introduction

1.1 About this guide

This user manual contains instructions and safety information for the commissioning, installation and maintenance of the BKC BBK boiler.

This guide is intended for:

- The owner of the BKC BBK boiler & Installer.
- Employees operating the BKC BBK boiler.
- The mechanic who performs work or maintenance work on the BKC BBK heating boiler.

1.2 Product description

BBK Boiler the BBK boiler is specially designed for very low Nox emissions, this is achieved by applying a large diameter combustion chamber with an extended burnout length. Nox emissions of 40 mg at 3% O2 are possible, depending on the type of burner (warranty must be given by the burner supplier). The BBK is a highly efficient single-pass boiler with economiser. Efficiency is at least 83% without condenser at full load, return temperature of 65°C, ambient temperature of 15 degrees and the burner adjusted to <3% O2. The boiler is partly designed to work with a heat storage tank. For proper boiler control, an open buffer system with frequency-driven pump and direct feedback must be used. An inspection hatch is available to inspect all vital parts.

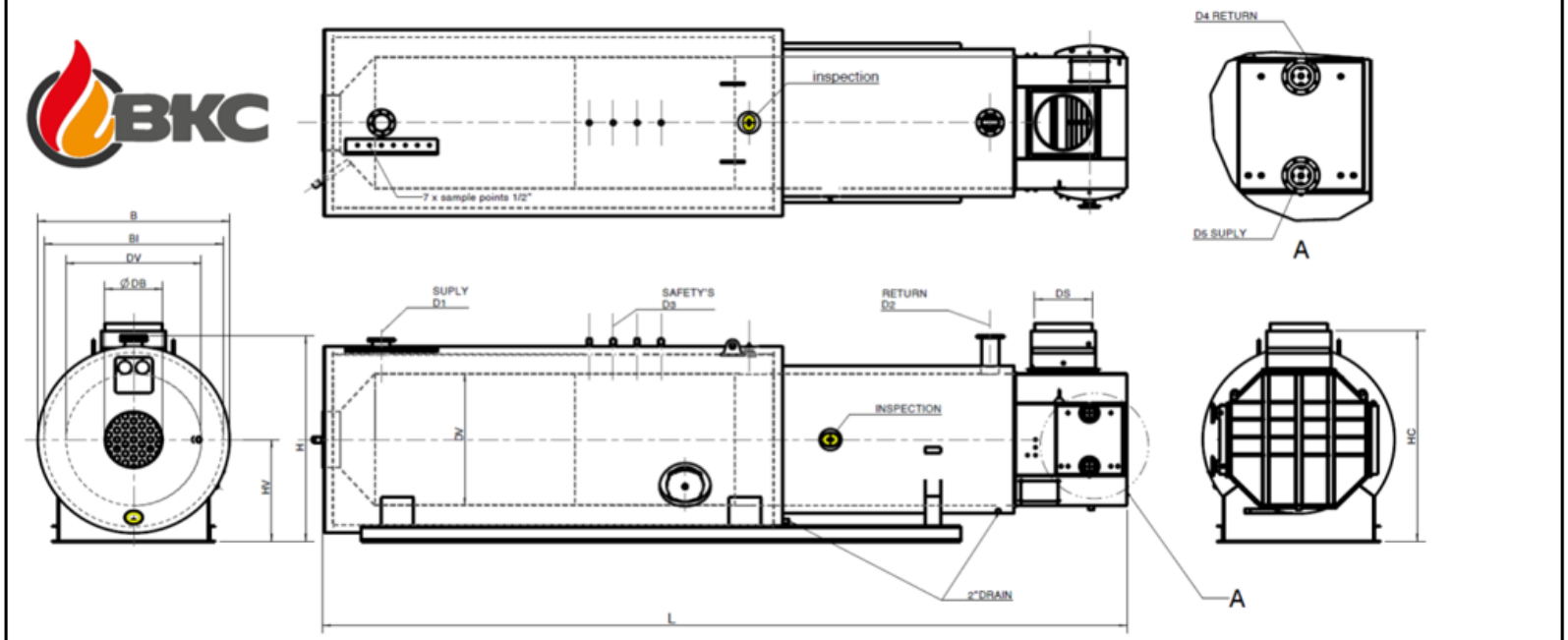
The boiler and condenser are pressure tested by means of water after production in our workshop. Pressure test and checklist can be requested from our sales department if necessary.

Type plate:

1.1 Overall view of dimensions

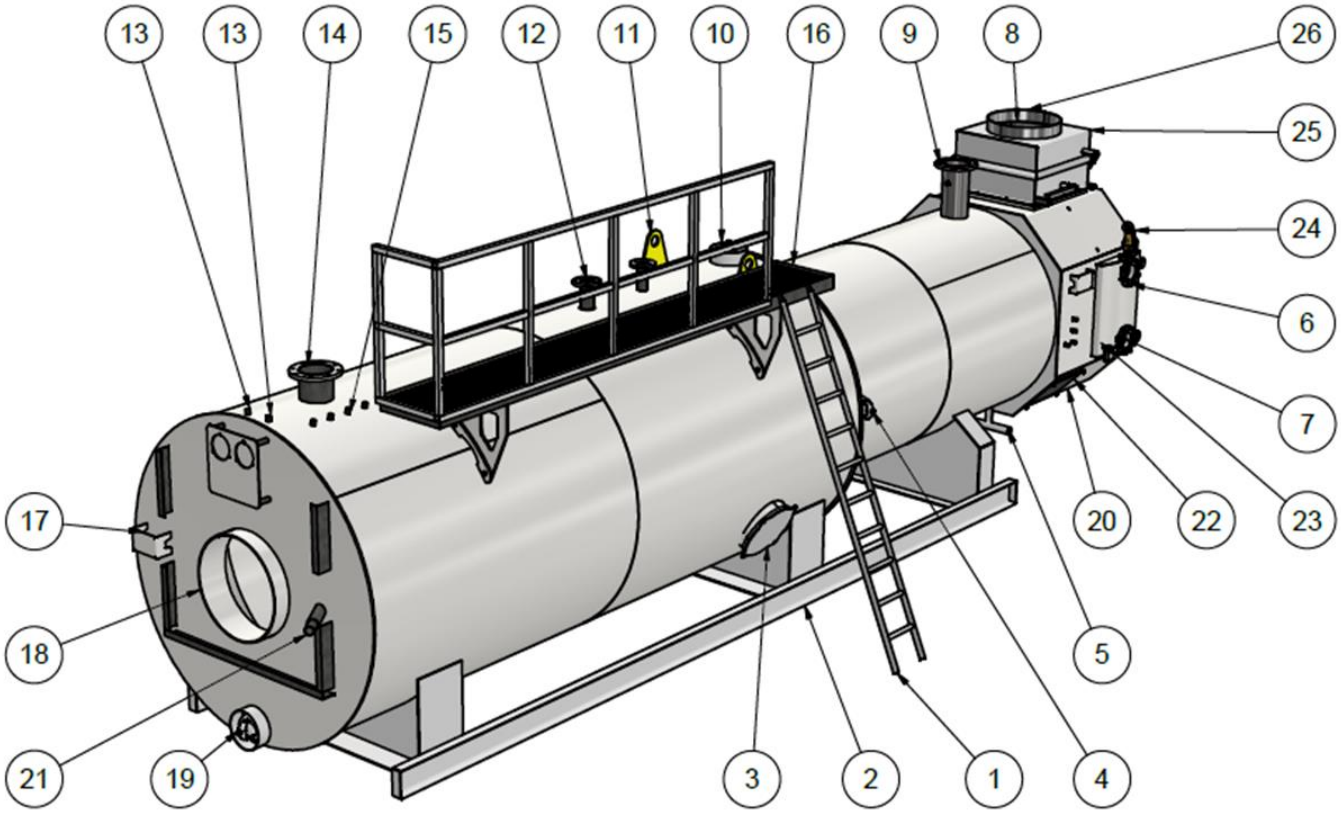
BBK-C **2 Bar 110°C**

Frame color: **RAL7021**
Isolation color: **RAL5009**



Boiler Type	Capacity in KW	GASSIDE RESISTANCE	EMPTY WEIGHT KG	WATER CONTENT M³	DV	DB	L	B Incl. insulation	BI excl. Insulation		H transport	HC Height Chimney	HV	D1/D2 PN10	D3 Thread	D3 FLANGE PN16	Ø DS Sea level	Ø DS +500 mtr (above sea	D4/D5	BRC condenser connection height hart of the flue gas
BBK 2.00	2326	7.5 mbar	7016	7,6	1250	560	8930	1800	1640		2324	2318	1224	DN150	2X2"	1XDN80	500	500	DN100 PN16	-
BBK 2.50	2908	7.5 mbar	8005	8	1250	560	9430	1800	1640		2324	2318	1224	DN200	2X2"	1XDN80	500	500	DN100 PN16	-
BBK 3.00	3489	7.5 mbar	8952	8,6	1400	560	8930	2000	1840		2309	2324	1224	DN200	3X2"	1XDN10	500	500	DN100 PN16	-
BBK 3.50	4071	7.5 mbar	9235	8,9	1400	560	9430	2000	1840		2309	2324	1224	DN200	3X2"	1XDN10	500	500	DN100 PN16	-
BBK 4.00	4652	7.5 mbar	12265	13,8	1700	704	9566	2400	2260		2635	2756	1310	DN200	4X2"	1XDN65	600	700	DN125 PN16	-
BBK 5.00	5815	8.5 mbar	13087	14,1	1700	704	10566	2400	2260		2635	2756	1310	DN200	4X2"	2XDN8	600	700	DN125 PN16	-
BBK 6.00	6978	8.5 mbar	14218	14,3	1700	704	10608	2400	2260		2635	2756	1310	DN200	5X2"	1XDN10	600	700	DN125 PN16	-
BBK 7.00	8141	8.5 mbar	16394	14,5	1800	704	10608	2460	2300		2670	2928	1340	DN250	6X2"	2XDN10	700	800	DN150 PN16	-
BBK 8.00	9304	8.5 mbar	17010	14,7	1800	704	11136	2460	2300		2670	2928	1340	DN250	7X2"	1XDN12	700	800	DN150 PN16	-
BBK 9.00	10467	8.5 mbar	19089	17,1	2000	704	11186	2650	2490		2850	3033	1435	DN300	8X2"	1XDN12	800	800	DN150 PN16	-
BBK 10.00	11630	9.0 mbar	19567	16,5	2000	704	11186	2650	2490		2850	3033	1435	DN300	8X2"	2XDN12	800	900	DN150 PN16	-
BBK 11.00	12793	10.0 mbar	24721	24,7	2200	830	11656	3000	2840		3265	3277	1680	DN300	9X2"	1XDN25	900	900	DN150 PN16	1780 mm
BBK 12.00	13956	11.0 mbar	25093	24,2	2200	830	10844	3000	2840		3265	3277	1680	DN300	10X2"	1XDN25	900	900	DN150 PN16	1780 mm
BBK 12.00	13956	11.0 mbar	25093	24,2	2200	830	*12430	3000	2840		3265	3277	1680	DN300	10X2"	1XDN25	900	900	DN150 PN16	1780 mm
BBK 16.00	16000	12,0 Mbar	33164	30,2	2500	850	11498	3340	3140		3445	2558	1710	DN300		2x DN150	1100		DN200 PN16	1354 mm

*** Include bolted BRC 12 Con** **Supply ↑** **Return ↓**
(Transport length 10726 mm)
D4 is in (From the greenhouse to the condenser)
D5 is uit (to the boiler D2)



1. Stairs
2. Slide beams
3. Inspection hatch
4. Boiler Handhole
5. Drain
6. Entering water
7. Outbound water
8. Flue gas discharge
9. Return connection ↓
10. Boiler Handhole
11. Lifting eyes
12. Overpressure 2" or DN
13. Pressure and temperature
14. Supply connection ↑
15. Connection for burner measurement
16. Walkway
17. Type of plate holder
18. Furnace
19. Boiler Handhole
20. Condenser
21. Sight glass fire chamber
22. Service hatch
23. Siemens Thermostat
24. Watts Spring Safety valve
25. Flue Gas Valve Gas/Oil
26. Chimney connection

1.4 Setup according to NEN-3028

The boiler must be placed in a boiler room, unless it is housed in a business premises (a workshop, etc.).

The latter description may not be used in such a way as to create a risk of fire or damage to the boiler.

The boiler room floor must be purely level and flat so that the boiler slide beams rest on the floor over their full length and give the boiler a purely horizontal position.

The boiler room floor must be designed to withstand the weight of the filled boiler along with its associated products, taking into the pressure points from boiler supports or sliding beams.

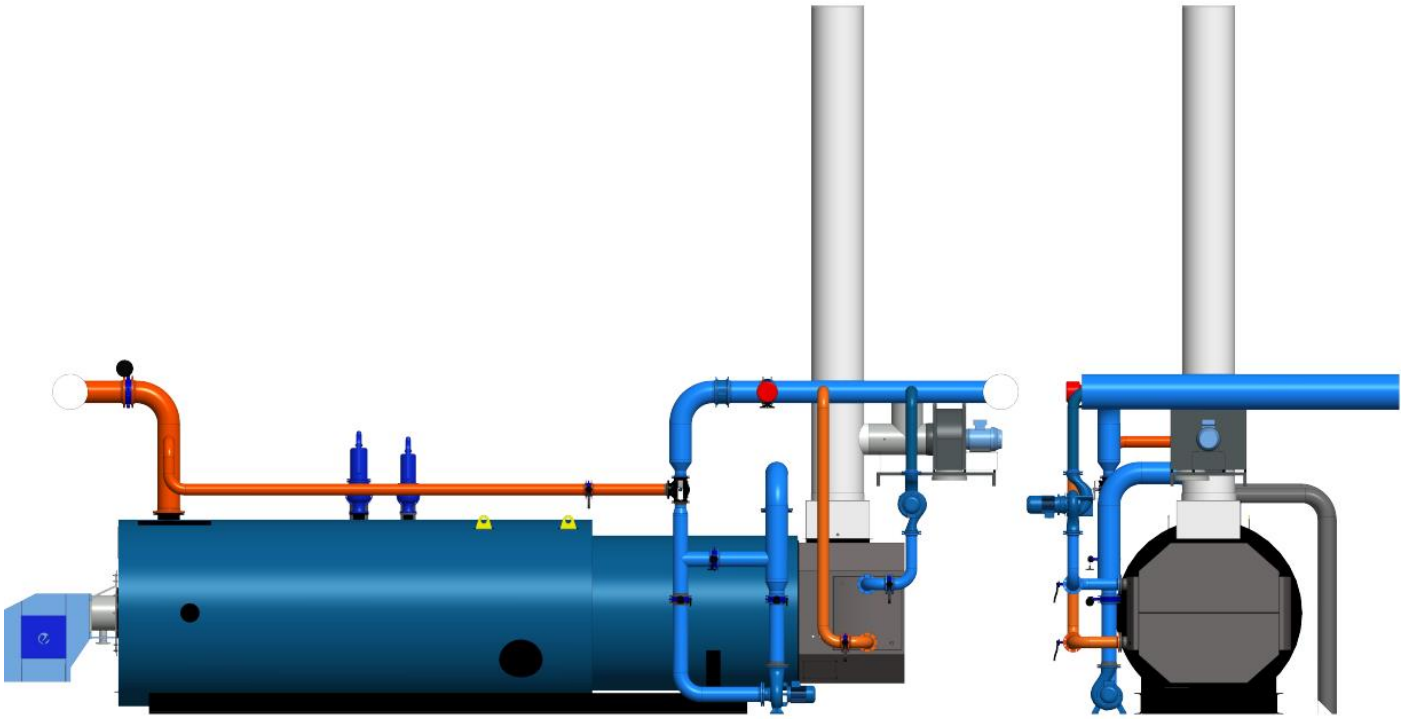
The distance between the boiler and the walls must be sufficiently enough for mounting and disassembling the burner, pumps, fire tubes, etc.

The boiler house must be electrically illuminated sufficiently and efficiently by means of fixed luminaires in such a way that work on the installation can be carried out even in the absence of daylight.

The room in which the boiler is set up must be provided with sufficient ventilation for combustion air and ventilation.

The implementation of the ventilation in the boiler house must comply with the regulations of local and national requirements.

At all times, it must be avoided that the burner fan is contaminated with
mists or components of crop protection or other chemicals (propellants from aerosols) etc. when sucking in air, in order to prevent corrosion in the boiler.



1.5 Warranty

The delivered boiler is covered by a warranty period of 24 months after delivery date excluding travel and accommodation costs. In order to meet the warranty, the boiler and the heating system (of which it is a part) must be filled with threated water which must meet the requirements set by BKC and which are described in the chapter treated water **5.3**.

2.0 Safety

2.1 Introduction

Please observe the instructions in this user manual before working with the boiler. Failure to comply with the instructions in this user manual may put people, the environment and the boiler at risk. Keep this user manual in an accessible place close to the boiler for later reference.

2.2 General safety requirement

- Follow this manual carefully, it is a very important part of our warranty. Ignoring the manual may void the warranty.
- This manual is only valid for boiler delivery(s) from BKC. Materials supplied by a third party will have to provide their own user manual by the manufacturer or his representative.
- For transport and assembly purposes, only lifting points/eyes on the boiler be need.
- After assembly, the boiler must be equipped with a proper (reinforced) drain and blow-off pipework which are directed to a safe location where the pressure can be safely discharged. The steam released by overpressure can cause burns.
  No additional forces or moments caused by connected piping are allowed on the boiler and connection points.
- One or more safety valves must be mounted on the boiler in accordance with international regulations ISO 4126.
- Local safety regulations must be observed. The safety devices must be designed in such a way that they can blow off the full capacity of the boiler.
- The boiler must be equipped with a low-water detection system. When this layer detects water, the burner must be turned off. Ask your burner supplier for more information.
- The boiler must be equipped with a modern burner that prevents the accumulation of flammable or explosive gases and avoids the backfire of the flame.
- If the boiler is damaged during transport or assembly, it is not allowed to put the boiler into operation. Immediately notify the manufacturer, BKC.
- The boiler is only designed and intended for producing 95° hot water to a value and pressure as described on the nameplate and should only be used for this purpose.

2.3 Warning

During operation, no lids, flanges or safety devices may be loosened or removed. Several non-insulated parts of the boiler can cause severe burns when touched. Before commissioning, the boiler must be grounded to prevent static electricity.

2.4 Foreseeable misuse

The following is considered foreseeable misuse:

- Use of untreated feed water
- Failure to follow the instructions in this user guide.
- Failure to correct errors or defects in the boiler.
- Failure to carry out inspections and maintenance work.
- The unauthorized removal or modification of parts or safety components of the boiler
- The use of parts or accessories that are not approved by the manufacturer.

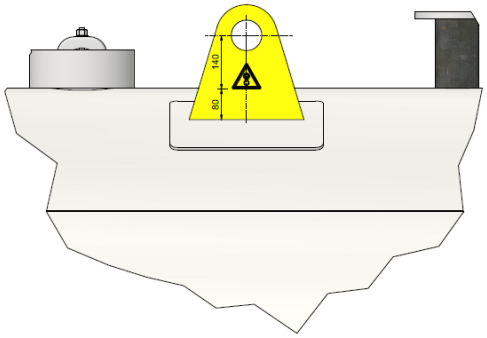
The installation must be installed by a skilled installer and comply with the applicable international and national standards.

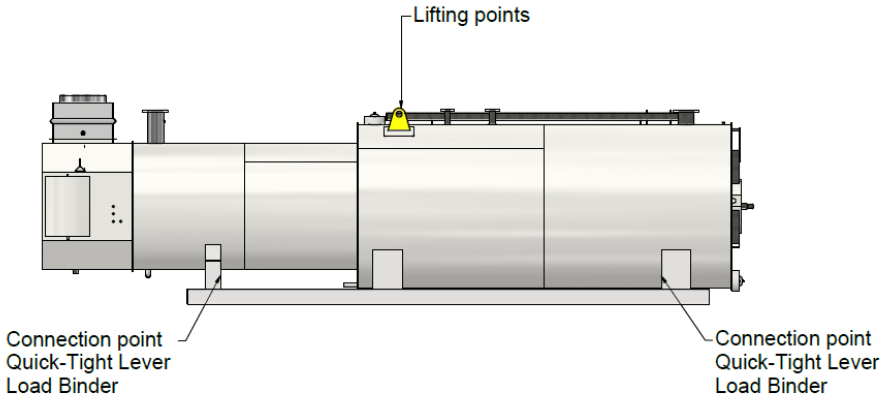
3.0 Transport

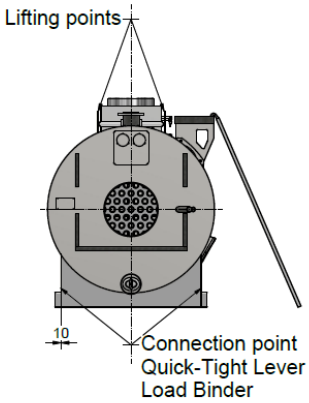
3.1 Loading

The boiler is equipped with 2 or more yellow painted lifting eyes, which are located above the center of gravity. These lifting eyes must be used to lift the boiler. Always use the correct lifting equipment for the total weight of the boiler according to the IIA declaration. Make sure that no one is under or near when lifting the boiler. For the weights of the boiler see **1.3 Total overview dimensions.**

The lifting eyes where the boiler should be lifted are indicated with stickers on the boiler and/or on the transport packaging. Any other lifting points without stickers or yellow color are not allowed for liftimg the boiler; these are for internal use only.







3.2 Transport

For the transport of the boiler, condenser, and accessories, ensure the correct cargo securing.
The regulation on vehicles is part of the Dutch traffic legislation and stipulated in article 5.18.6:
The load must be secured in such a way that it cannot fall or slide off the vehicle under normal traffic situations, including full brakes, sudden evasive manoeuvres and poor road surface. Loose cargo that is at risk of falling (or parts thereof) while driving the vehicle must be properly covered. Use special non-slip mats on which the boiler can be placed. The boiler can be secured to the front and rear of the boiler support with quick-tight level load binders. See above drawing "Connection Point".

3.3 Storage

The boiler consists of metal parts, which are susceptible to corrosion. The boiler is not suitable for outdoor installation.
Always place the boiler in a dry indoor location. Care must be taken to ensure that there is a floor that is heavily sufficiently grounded to support the total weight of the boiler filled with treated feed water. The boiler room floor must be purely level and flat so that the boiler slide beams rest on the floor over their full length and give the boiler a purely horizontal position. and give the boiler a purely horizontal arrangement, this prevents air from remaining in the boiler.
The boiler must be easily accessible for inspection and maintenance activities, with sufficient space available for the boiler door to facilitate cleaning and potentially replacing the flue tubes.

4 Installation

4.1 Boiler & temperatures

The following inspection and safety components must be supplied and assembled by an approved installer. The articles are essential for safe and correct use and optimal operation of the boiler. Make sure that all necessary materials comply with national and local rules and regulations.

It is advised to record the temperatures at the water outlet, water supply and flue gas of the boiler as a control and reference point. The difference between supply and return water temperature should never exceed 25°C
due to thermal stress in the boiler.

The temperature at the water outlet of the boiler can be controlled by external temperature controller and by the PID of the burner. The minimum temperature should be about 70 °C. The maximum allowable temperature depends on the type of heating system/boiler (see boiler nameplate) and especially local regulations.

The temperature of the return water to the boiler should be related to the dew point of the flue gases to prevent condensation of the flue gases in the boiler and chimney. The temperature of the return water from the water to the boiler shall not be lower than 70°C when burning light fuel oil and not lower than 65°C when burning natural gas. The gas and/or oil must be free of sulphur.

At low loads, the temperature should not be lower than the dew point to prevent condensation in the boiler
On/off operation should always be avoided.

The dew point of the flue gases depends on the type of fuel being fired and its composition.
The exhaust temperature of the flue gases must be so high that condensation does not form in the boiler, flues or chimney.

To prevent cold spots in these areas, the channels should be insulated. Also, soot, dirt, and dust can cause condensation spots. Keep all surfaces clean.

4.2 Low water level protection

The boiler must be equipped with a low water level protection which makes it impossible for the burner to be in operation while the boiler is not completely filled with water. The low water level protection must at least bear the CE mark and must comply with the regulations of the national and regional authorities.

4.3 Maximum thermostat

The boiler must be equipped with a (fail-Safe) maximum thermostat which may be set to a maximum of 108 °C
The maximum thermostat should turn off and lock the burner when the set temperature is reached.
If thermostat is set above 98°C, the installation must be carried out with a
minimum water pressure (Pressostat) protection.
The protection must be set to at least 0.5 bar and must be mounted directly on top of the boiler.
The protection device should switch off and lock the burner if water pressure falls below the set pressure.

4.4 Flue gas extraction

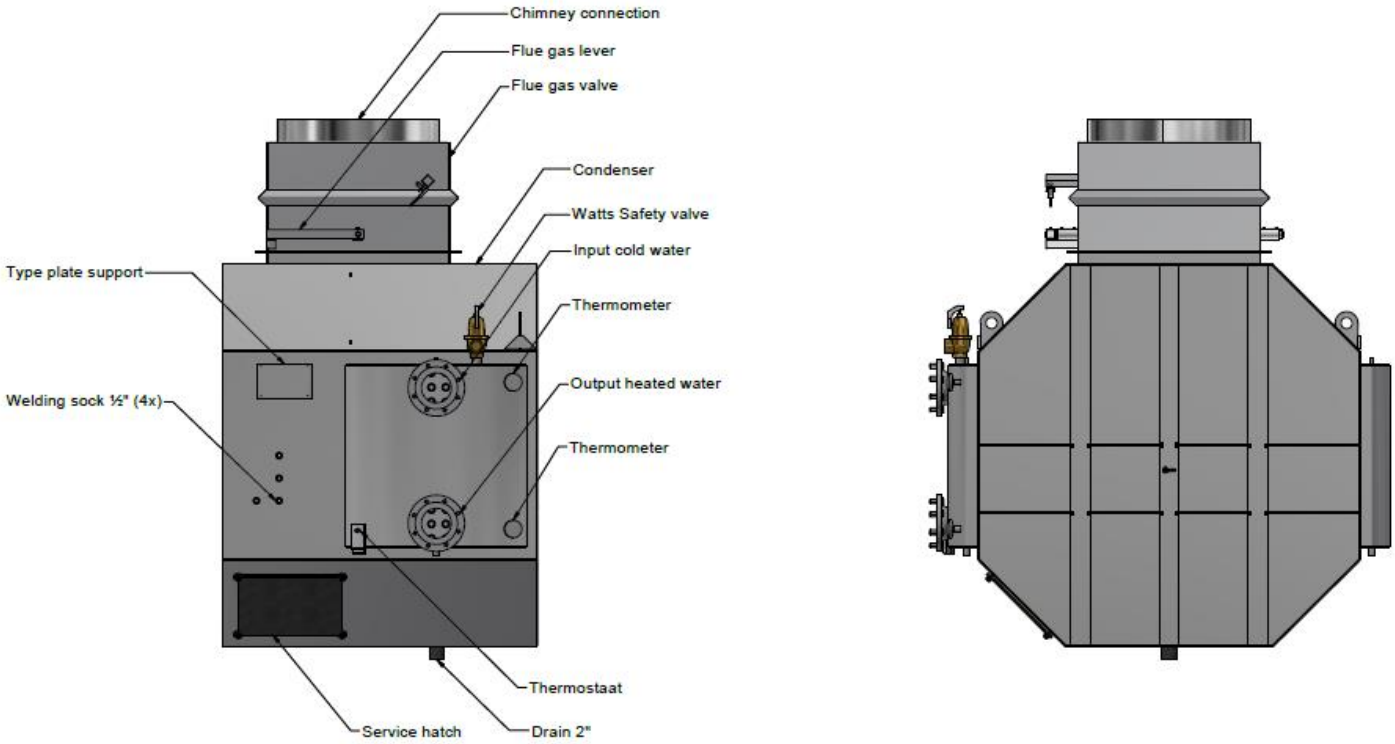
The boiler's chimney must be designed and installed in accordance with national and regional regulations. The maximum allowable weight load due to the flue gas exhaust on the boiler's smoke box is 500kg. The chimney must be adequately braced to prevent the effects of wind.

4.5 Condenser

In a BBK boiler, the condenser is directly welded to the economizer. The condenser absorbs heat from the flue gases and transfers it to the feedwater. The condenser also has a few welded ½" socket welds, with one of them used for temperature measurement before entering the condenser. After the condenser, there's a ½" socket weld in the chimney for temperature measurement after condensation. Record the temperatures before and after the condenser for an initial temperature measurement to be logged.

There is a service hatch at the bottom of the condenser, make sure that the bottom of the condenser is checked 2 times a year and any dirt and rust parts are removed so that condensation water can be drained, this prevents condensation water from flowing through the flame tubes into the fire corridor. Also check the steam trap 2x a year to make sure there is no dirt in it, which can slow down the condensation water. The protections must be tested at least once a year, if possible, in combination with the maintenance of the burner.

The combustion gases must be free of contaminants, such as sulphur, chloride and halogen gases.
Sulphur content < 10 mg/m3; chloride content of condensate <1 mg/l.
The above contaminants in the combustion gases can lead to damage to the flue gas condenser.



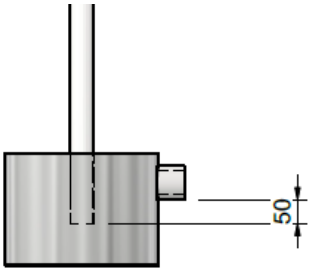
CAUTION	
HOT PARTS	Condenser and chimney contain hot parts

4.6 Chimney

The chimney must be placed on the existing chimney connection must be carried out and mounted in accordance with national and regional legislation. The flue gas outlet must be properly piped to prevent wind influences.
If a chimney is not placed directly on the boiler, the flue gas flow must, upon entering the chimney flowing in.
In this case, the chimney can be placed both inside and outside the boiler house.
The connection piece and the chimney itself must be insulated.
Chimneys supplied by BKC will always be equipped with a 1/2" welding sock for checking the outgoing flue gas temperature.

4.7 Steam trap for the drain of the Condenser.

To ensure proper functioning of the steam trap, the drain pipe must end at least 50 mm below the outflow opening in the steam trap to create a water trap.



4.8 Pressure protection

It is necessary that sufficient safety valves with a minimum pressure are mounted on the boiler according to locally applicable standards, but not smaller and or less than stated according to column "**D3**" in **1.3 Total overview** dimensions.
These must be mounted directly on the boiler body, i.e. without intermediate shut-off valves. Furthermore, unsalable pipes must be installed from the safety valves in such a way that any blown hot water and/or steam cannot cause damage or injury to humans, animals, or the environment. Before starting the boiler, the operation of the safety valves must be checked. Use a good pressure gauge.
The safety valves must at least indicate:
- Type designation or identification mark of the manufacturer.
- Setting pressure in Bar overpressure.
- The maximum discharge power in kW, at a setting pressure for which the safety valve is supplied by the manufacturer. It should also be considered that the pass-through calculation and number of safety valves must comply at least in accordance with PED & CE regulations, and in accordance with national and regional regulations.

4.9 Connections to the boiler

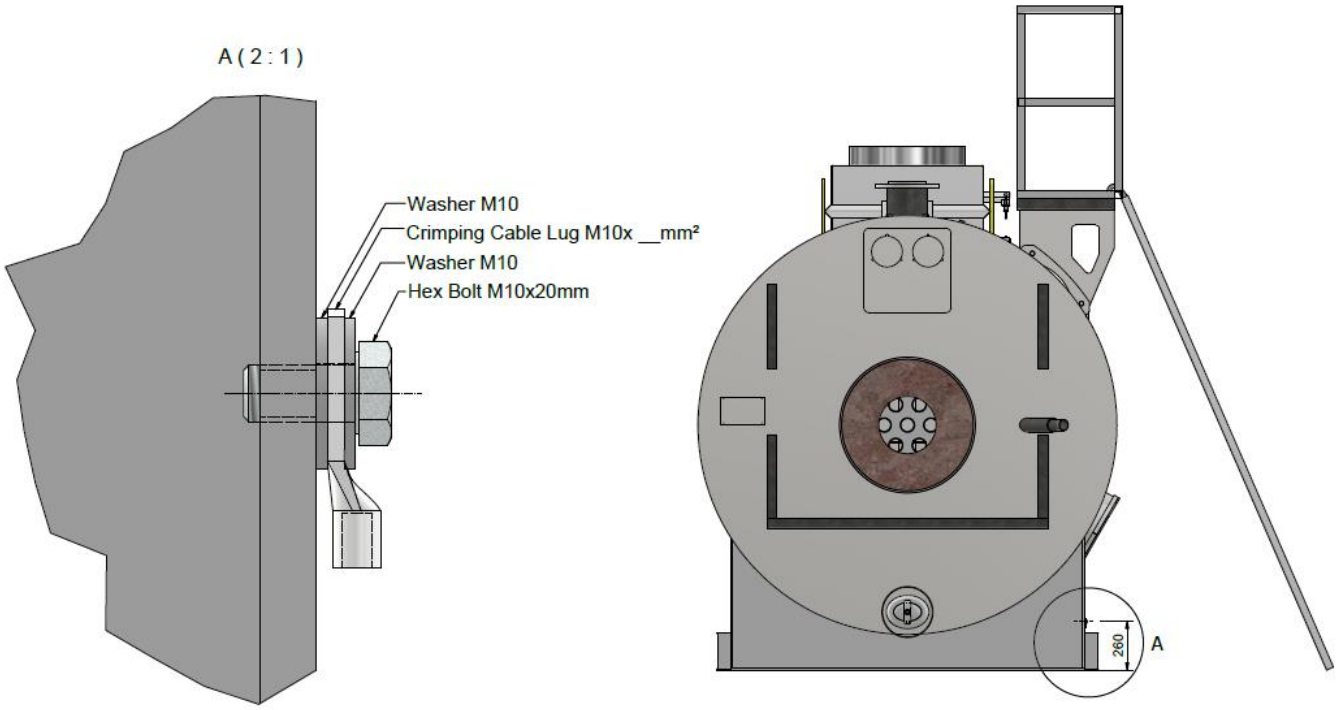
The pipes to be connected to the boiler must be laid in such a way that no forces are exerted on the boiler connections by expansion or otherwise. No changes to the boiler connections may be made or added without the manufacturer's permission.

4.10 Insulation

The boiler is equipped with insulation with plating. The insulation consists of 100 mm non-combustible insulation wool which is applied in two layers of 50 mm. The insulation is carried out without thermal bridges. If no insulation is carried out on the boiler, the insulation requirements mentioned above must be applied, in such a way that the surface temperature will be as low as possible but a maximum of 80 °C.

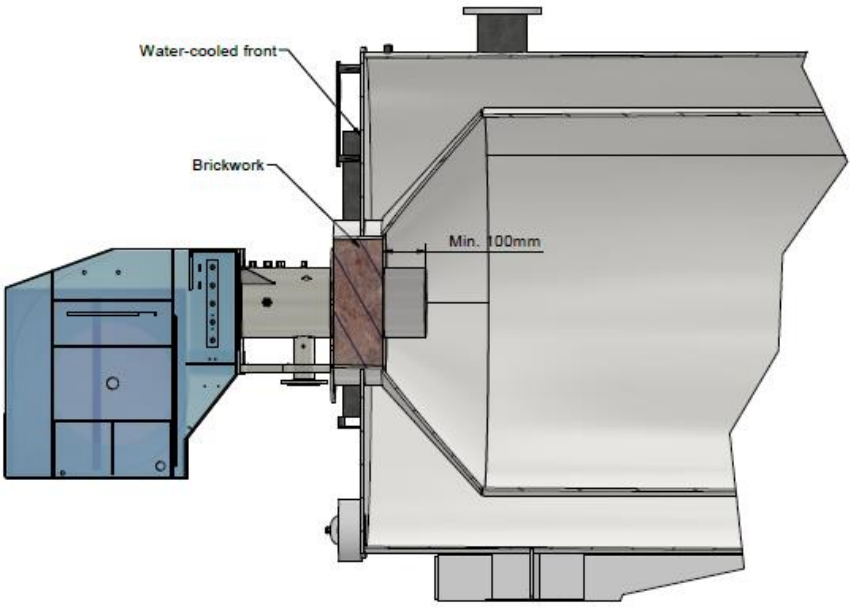
4.11 Grounding

After the boiler has been set in its permanent place, the boiler must still be grounded to prevent static charge with gas and oil. No provisions have been made for this in the boiler base . The grounding must be drilled and tapped into the undercarriage of the boiler. When not tapping and a bolt-nut connection is used, it must be ensured that the bolt makes good contact with the frame. Here the paint will have to be removed around the ring so that the bolt makes direct contact with the frame.
Wire diameter must be determined by an electrical installer.



4.12 Refractory

When the burner is placed at the boiler, the space between the burner nozzle and the burner must be filled with refractory (Plibrico). See section below for information.



4.13 Release vessel

In accordance with NEN-EN 12828, combustion appliances with a capacity > 300 kW must have one of the following devices (a or b):

(a) An additional maximum temperature protection and an additional maximum medium pressure protection on each heat exchanger.
The maximum temperature protection shall be adjusted so that the maximum Operating temperature of the installation cannot be exceeded. This security can be realized with a maximum thermostat. In that case, it must comply with EN 60730-2-9.
The maximum medium pressure protection must intervene at a pressure lower than the adjustment value of the safety valve.

(b) A relaxation vessel on the blow-off side in the immediate vicinity of the safety valve. This should be connected to a vapor exhaust pipe that drains upwards to the open air and are equipped with safe water drainage. The safety valve and the method of installation must comply with NEN-EN 12828.

NEN3028: 2016
Condensor capacitys :
BKC condensers behind BKC type WND and BBK boilers with 76.1 x 3.2 mm tubes

Boiler models					Boiler output in kW on type plate	Condenser power in kW at 95° through the condenser
WND	1.00	&	BBK	1.00	1163-1200	45-50
WND	1.25	&	BBK	1.25	1454-1500	60-62
WND	1.50	&	BBK	1.50	1745-1800	72-74
WND	2.00	&	BBK	2.00	2326-2400	96-99
WND	2.50	&	BBK	2.50	2908-3000	120-124
WND	3.00	&	BBK	3.00	3489-3600	144-148
WND	3.50	&	BBK	3.50	4071-4200	168-173
WND	4.00	&	BBK	4.00	4652-4800	192-198
WND	5.00	&	BBK	5.00	5815-6000	240-248
WND	6.00	&	BBK	6.00	6978-7200	288-297
WND	7.00	&	BBK	7.00	8141-8400	336-347
WND	8.00	&	BBK	8.00	9304-9600	384-396
WND	9.00	&	BBK	9.00	10467-10800	432-446
WND	10.00	&	BBK	10.00	11630-12000	480-495
WND	11.00	&	BBK	11.00	12793-13000	528-537
WND	12.00	&	BBK	12.00	13956-14000	576-578
WND		&	BBK	16.00	19000	785

Condenser falls outside NEN3028:2016 regulation
Condenser falls within NEN3028:2016 regulation

5 Commissioning

5.1 Commissioning and boiler firing

Before the first commissioning of the boiler takes place, it is necessary to check that there are no tools or other materials in the boiler that may have been left behind during work.

Check if the boiler is sufficiently filled with system water (**See 5.3 Water quality**).
Check if the sludge manholes, inspection, and explosion hatches are tightly closed.
Check that the condensate drain fitted at the bottom of the condenser has a free outlet to the condensate trap so that the condensate water can leave the condenser to the steam trap so that the condensation water can leave the condenser.

Determine whether the free discharge of the flue gases through the chimney is guaranteed.
Check if the expansion tank/system is open and operational.
Check if the shunt pump is running and that any taps in the shunt pipe are open so that the flow/flow of the pump is controlled.

The boiler should be fired gradually at a small setting not exceeding 25 % of the maximum boiler capacity to prevent unacceptable material stresses and the cracking of the refractory may occur. Fire up the boiler with the 25% of the maximum capacity until the boiler has reached the minimum temperature of 65 °C.
Above 65°C, the burner may gradually be increased in capacity to the desired set temperature is reached, for example 95°C.
Before the burner is installed in capacity, make sure that the control and pumps are on so that they dissipate the heat produced and guarantee the minimum entry temperature of the boiler.

When the boiler is fired up from a cold position, the boiler condenses, so there is a risk of leakage due to the condensate. When natural gas is used, a lot of condensates is formed from the flue gases on the still cold surfaces in the boiler. After the first firing of the boiler, you need to check all the bolts of the flanges and hatches.

5.2 Fuel

The boiler is specially designed for burning natural gas or oil. Make sure that the correct circulation channel for the flue gas valve is applied. See **5.5 Operating flue gas valve.**

5.3 Water quality (feed water)

The water used as feed water for the boiler and the installation (of which it is a part) must be treated if the water contains components that can, for example, form scale in the boiler, or have a corrosive effect. Scale will be formed by hard-water.

Scale can cause such a heat transfer inhibiting effect that one or more flame pipes, pipe plates and the fire corridor can be damaged.
The degree of corrosion of the water is mainly caused by the presence of oxygen and/or freely bound carbon dioxide. The treatment of the feed water must be such that the hardness, oxygen and bound carbonic acid in the water is limited.

For the above reasons, the feed water may have little or no hardness, all the more so because once formed scale is difficult to remove, depending on its composition. The hardness of the make-up water used again depends on the way in which the hard water is treated.
It is therefore important that the values mentioned below with regard to the required water quality are kept at least and punctually.
The owner of the boiler is responsible for correct water quality as stated on the sticker on the front of the boiler.
The following image shows what the feed water for the boiler must meet.

Water requirements

LET OP!!! ATTENTION!!!

Voor het inbedrijfstellen dient de waterkwaliteit aan deze norm te voldoen

The waterquality shoult meet the standars before operating

Table 5-1 Feedwater for steam boilers (exept attemperator spray water) and hot water boilers

Parameter	Unit	Feedwater for steam boilers		Make-up water for hot water boilers
Operating pressure	bar (= 0,1 MPa)	> 0,5 - 20	> 20	total range
Appearance	—	clear, free from suspended solids		
Direct conductivity at 25 °C	µS/cm	not specified, only guide values relevant for boiler water see table 5-2		
pH value at 25 °C a	—	> 9,2 b	> 9,2 b	> 7,0
Total hardness (Ca + Mg)	mmol/l	< 0,01 c	< 0,01	< 0,05
Iron (Fe) concentration	mg/l	< 0,3	< 0,1	< 0,2
Copper (Cu) concentration	mg/l	< 0,05	< 0,03	< 0,1
Silica (SiO_2) concentration	mg/l	not specified, only guide values for boiler water relevant, see table 5-2		—
Oxygen (O_2) concentration	mg/l	< 0,05 d	< 0,02	—
Oil/grease concentration (see EN 12953-6)	mg/l	< 1	< 1	< 1
Organic substances (as TOC) concentration	—	see footnote e		

a With copper alloys in the system the pH value shall be maintained in the range 8,7 to 9,2.

b With softened water pH value > 7,0 the pH value of boiler water according to table 5-2 should be considered.

c At operating pressure < 1 bar total hardness max. 0,05 mmol/l shall be acceptable.

d Instead of observing this value at intermittent operation or operation without deaerator if film forming agents and/or ex- cess of oxygen scavenger shall be used.

e Organic substances are generally a mixture of several different compounds. The composition of such mixtures and the behaviour of their individual components under the conditions of boiler operation are difficult to predict. Organic substances may be decomposed to form carbonic acid or other acidic decomposition products which increase the acid conductivity and cause corrosion or deposits. They also may lead to foaming and/or priming which shall be kept as low as possible.

Table 5-2 boiler water for steam boilers and hot water boilers

		Boiler water for steam boilers using Feedwater direct conductivity			Boiler water for hot water boilers
Parameter	Unit	> 30 µS/cm		≤ 30 µS/cm	
Operating pressure	bar (= 0,1MPa)	> 0,5 - 20	> 20	> 0,5	total range
Appearance	—	clear, no stable foam			
Direct conductivity at 25 °C	µS/cm	< 6.000[a]	see Figure 5-1 a	< 1.500	< 1.500
pH value at 25 °C	—	10,5 - 12	10,5 - 11,8	10-nov	9 - 11,5 d
Composite alkalinity	mmol/l	1 - 15[a]	1 - 10[a]	0,1 - 1,0[c]	< 5
Silica (SiO_2) concentration	mg/l	pressure dependent, according to figure 5-2			—
Phosphate (PO_4) e	mg/l	10 - 30	10 - 30	6 - 15	—
Organic substances	—	see footnote - f			—

a With superheater consider 50 % of the indicated upper value as maximum value.

b Basic pH adjustment by injecting Na3PO4, additional NaOH injection only if the pH value is < 10.

c If the acid conductivity of the boiler feedwater is < 0,2 µS/cm Na + K concentration is < 0,010 mg/l, phosphate injection is not necessary. Under the conditions AVT (all volatile treatment, feedwater pH 9,2 and boiler water pH 8,0) can be applied, in this case the acid conductivity of the boiler water is < 5 µS/cm.

d If non-ferrous materials are present in the system, e. g. aluminium, they may require lower pH value and direct conductivity, however, the protection of the boiler has priority.

e If coordinated phosphate treatment is used; considering all other values higher PO4-concentrations are acceptable.

f See e in table 5-1.

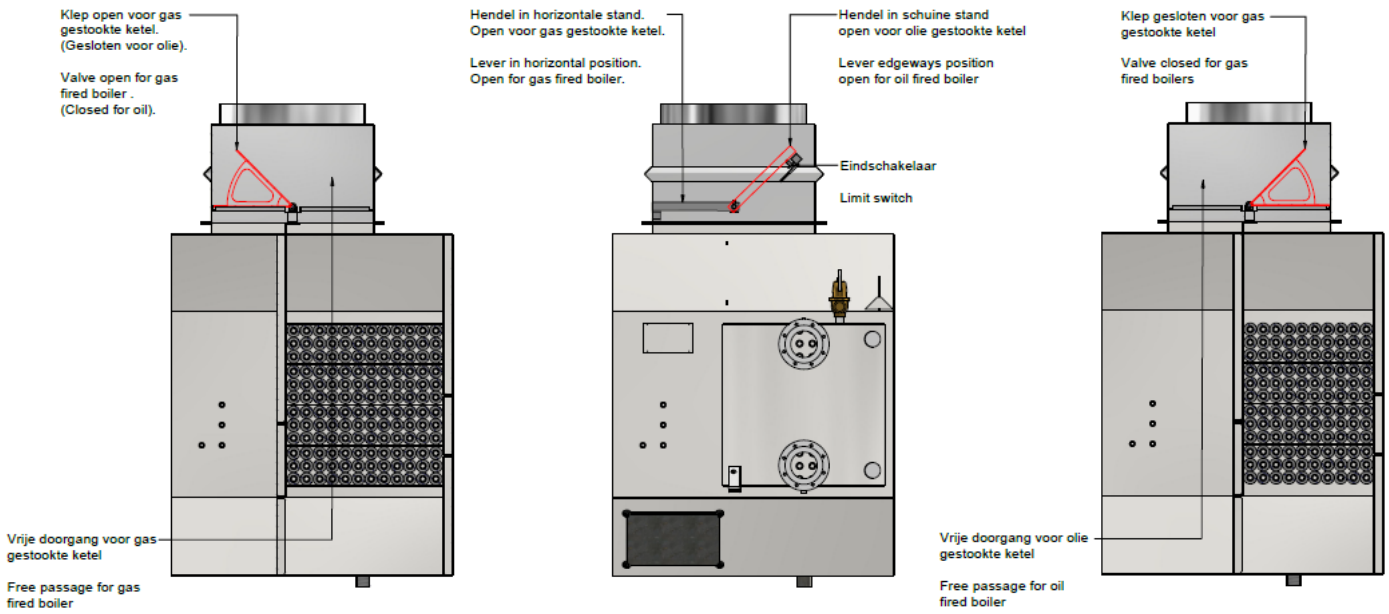
5.4 Cold Laying Boiler

We advise you to keep the boiler at operating temperature, if possible. Try to avoid on/off operation and often "cold" start-up of the boiler, this will prevent corrosive condensation of the flue gases and thermal stresses during boiler start-up.

1. Turn off the main power of the boiler and burner.
2. Does the boiler and chimney cleaned carefully?
3. Close all doors and openings of the boiler. After preservation, avoid air circulation in the boiler. The treatment of boiler feed water must be perfect. The main danger with boilers is the ingress of oxygen into the boiler water during prolonged standstill. During start-up, but also during shutdown, oxygen has a very corrosive effect. We recommend keeping the boiler in use as much as possible and not shutting down the boiler unnecessarily for a short time. Should the boiler be out of service for a longer period of time, it is necessary to carry out some form of preservation to prevent corrosion.
4. The condenser can be cleaned, especially with oil firing. In case of longer standstill, it is advisable to disassemble the chimney and close the flue gas outlet so that no more oxygen can enter the boiler or condenser.
5. Waterside one can choose between wet and dry preservation. Wet preservation binds all oxygen with the water in the boiler and consists in completely filling the boiler with water, the PH value of the water is sufficiently increased and an oxygen-binding substance is added.
   To do this, contact your local water treatment company.
6. Dry preservation means that the boiler is completely emptied, so that the steel cannot corrode. The boiler is completely emptied and dried, all water pipes must be closed. A water-binding solvent is put into the boiler, after which all boiler openings are opened. The water-binding solvents will further absorb all the remaining water.
7. Beware of vacuum when draining the entire boiler.

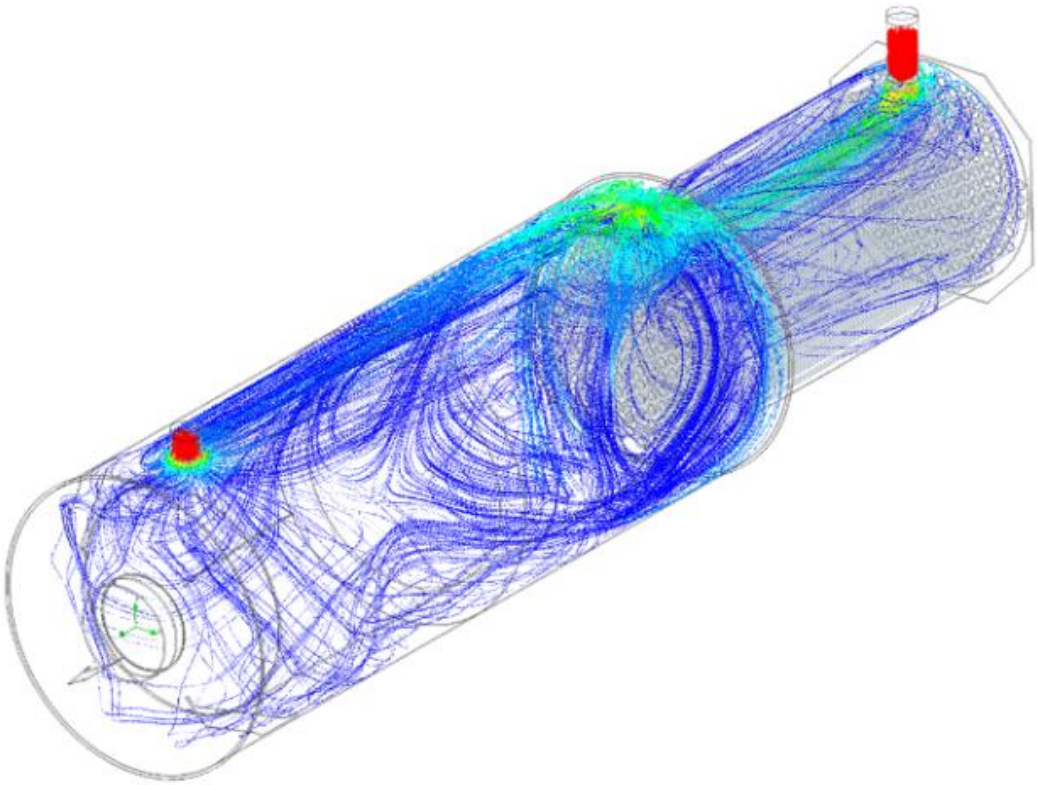
5.5 Flue gas valve operation

When firing on oil or gas, the flue gas valve must be in the correct position as shown in the following figure. When setting to the oil-fired position, a signal will be transmitted to the burner panel by means of a limit switch that is pre-assembled to the flue gas box. Ask your burner supplier to connect this. The flue gas valve on a BBK boiler is located above the condenser.



5.6 Flow.

Below is a flow overview of the boiler water in a BBK boiler. At the bottom and the top of the Eco there is an opening from the Eco to the boiler. The hot water rises so that the boiler water is well mixed with the cold return water.



6 Maintenance

6.1 Controls

During the operation of the boiler, the amount of treated feed water that may be required for refilling the installation must be checked. In case of excessive refilling, there is a leak and this must be immediately detected and remedied, in order to prevent, among other things, oxygen corrosion. Flue gas-side leaks that occur during use must also be rectified immediately.

The flue gas temperature shall not exceed 100°C above the boiler water temperature and shall be measured regularly. When it rises, the flame pipes must be cleaned. For this, BKC has supplied a flame pipe sweeping brush.
Check the operation of the steam trap (if any) and the presence of sediment in the steam trap 2x a year.
Depending on the conditions of use, but at least twice a year, the boiler should be checked at the following points:
When entering the boiler, both water and flue gas side, ensure sufficient ventilation.
- Tightness of gaskets and boiler door(s), explosion hatch lid, swallow hole lid, sight glass.
- Tightness of flame pipe/pipe plate connections;- Contamination and corrosion of the flame pipes and other flue gas-sided surfaces;
- Condition of the burner refractory;
- Operation of the shunt system;
- Operation of the safety valve(s) or overflow valve(s).- Cleaning the steam trap
- Remove any dirt and rust parts around the drain via the manhole of the condenser.

Annual inspection:
- Water-side contamination such as sludge and scale, especially between the flame pipes at the location of the pipe plate fire-sided, pay attention to good aeration when draining the boiler:
- Water-sided corrosion.
- Once a year inspect and clean the boiler flue gas side.
- Control/sampling of the water quality by a professional company in this area.
- Discharge of the boiler part and economical. As soon as you open the discharge tap you will experience that the water is dirty. You should continue to spew until the water is clear again. Spraying is necessary to remove any sludge and sludge and prevent damage as a result.
- Check the burner factory for any damage and cracks.
- Check the ceramic wool of the fire corridor manhole and the gasket in the manhole cover to make sure it still closes tightly (Soft).
- For maintenance of the burner, please refer to the instructions of the burner supplier.
- After lighting the boiler, re-tighten the bolts of the relevant inspection holes.

6.2 Weather influences

During the annual inspection, care must also be taken to ensure that the boiler is still well protected against weather influences. For example, due to leakage of the roof above the boiler, which can cause water to get between the insulation of the boiler and cause external corrosion during standstill.

Certificate

CERTIgaz

Organisme Notifié N° 1312
Notified Body 1312

CERTIFICAT
Certificate

Règlement (UE) 2016/426 « Appareils à gaz »
EU TYPE EXAMINATION CERTIFICATE (« Gas appliances » (EU) 2016/426 Regulation
MODULE B : EXAMEN DE TYPE – TYPE DE PRODUCTION / Paragraphe 1 – Annexe III du règlement (UE) 2016/426 Appareils à gaz
MODULE B : EU TYPE – EXAMINATION – PRODUCTION / *Paragraph 1 – Annex III of the Gas appliances Regulation (EU) 2016/426*

Certificat numéro / *certificate number* : **1312DN6700**

CERTIGAZ, après examen et vérifications, certifie que l'appareil :
CERTIGAZ, after examination and verifications, certifies that the appliance:

- **Fabricant :** / *Manufacturer* — **BOETERS KETEL CONSTRUCTIE BV**
  Mariêndijk 7
  NL - 2675 SV Honselersdijk

- **Marque commerciale et modèle(s) :** / *Trade mark and model(s):* — **BKC**
  BBK 2.00 - BBK 2.50 - BBK 3.00 - BBK 3.50 - BBK 4.00
  BBK 5.00 - BBK 6.00 - BBK 6.50 - BBK 7.00 - BBK 8.00
  BBK 9.00 - BBK 10.0 - BBK 11.00 - BBK12.00

- **Genre de l'appareil :** / *Kind of the appliance:* — **Corps de chauffe**
  BODY TO BE FITTED WITH FORCED DRAUGHT BURNER B23

- **Désignation du type :** / *Type designation:* — **BBK**

Pays de destination *Destination countries*	Pressions (mbar) *Pressures (mbar)*	Catégories *Categories*
Suivant le brûleur. *Depending on the burner*		

Est conforme aux exigences essentielles du Règlement (UE) 2016/426 « Appareils à gaz ».
Is in conformity with essential requirements of Regulation (EU) 2016/426 « Gas appliances ».
Toute reproduction de ce certificat doit l'être dans son intégralité. *Reproduction of this certificate must be in full.*

Ce certificat est valide 10 ans à partir de la date de signature. Il annule tout certificat antérieur.
Validity date 10 years since signature day. It cancels any previous certificate.

1/1

Le Directeur Général

Puteaux, le 26 Octobre 2022

Claudie CANON

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UKCA TYPE – EXAMINATION CERTIFICATE n° UKCA 8510/0094
United Kingdom Conformity Assessment

AFNOR UK, after examination and verifications, certifies that the appliance:

Manufactured:	*BOETERS KETEL CONSTRUCTIE BV*
Address:	*Mariëndijk 7* *NL-2675 SV Honselersdijk*
Trademark and model(s):	*BKC* ➢ *BBK 2.00 - BBK 2.50 - BBK 3.00 - BBK 3.50 - BBK 4.00* ➢ *BBK 5.00 - BBK 6.00 - BBK 6.50 - BBK 7.00 - BBK 8.00* ➢ *BBK 9.00 - BBK 10.0 - BBK 11.00 - BBK12.00*
Kind of the appliance:	*BODY TO BE FITTED WITH FORCED DRAUGHT BURNER* *Types :* B23
Type designation:	*BBK*

Destination countries	*Pressures (mbar)*	*Categories*
Depending on the burner		

Is in conformity with Essential Requirements of Gas Appliances Regulation (EU) 2016/426 (as amended by the Gas Appliances (Enforcement) and Miscellaneous Amendment Regulations 2018, SI2018 No 389, as amended).

Type samples representative of product(s) have been tested and examined according to the procedures specified in Annex III Module B (Type Examination) for Regulation (EU) 2016/426 (as amended by the Gas Appliances (Enforcement) and Miscellaneous Amendment Regulations 2018, SI2018 No 389, as amended).

Date of initial certification: 2023-05-02 **Date of expiry: 2033-05-01**

AFNOR UK,
Approved Body Number 8510
for the above Regulation

Swindon, May 02nd , 2023

Fabienne Bonin-Bree Director

This certificate shall only be copied in its entirety and without change. 1/2

Kingston House, Lydiard Fields, Swindon, Wiltshire - SN5 8UB United Kingdom

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