



Installation and User Manual



ECCO - BURN

Dear Customer

Thank you for purchasing ECO-BURN solid fuel boiler. This instruction manual is intended to help you install and operate the product safely, properly and economically. Please read this manual carefully before installation and operation of your product, and keep it during the whole operation life. Do not touch or interfere any part of the product other than those allowed. The installation, maintenance and service of this boiler requires skilled technicians. For the installation of the boiler and proper room selection, installation of water circuit, chimney design, this manual and mandatory regulations must be considered.

Carry out maintenance and cleaning work recommended on your heating system at regular intervals. Details can be found later in the instruction manual. By doing this, you will not only be ensuring the operational reliability of your heating system but also its efficient and low-emission operation.

DECLARATION OF CONFORMITY

No. 0114

Type of the equipment : Hot water boilers for solid fuel (wood) with manual fuel supply
EN 303/5:2013

Trademark : **Thermasis**

Type designations : **ECOBURN 20**
ECOBURN 28
ECOBURN 35
ECOBURN 45
ECOBURN 60
ECOBURN 75

Manufacturer : **BOYSIS MAKINE TAAHHUT SANAYI ve TICARET A.Ş.**
Şerifali Mahallesi Hüsrev Sokak No.2 Erişkenler Plaza
Kat 3, 34775, İstanbul/TURKIYE

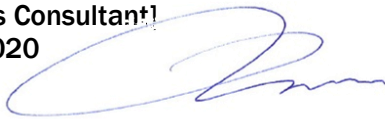
The following harmonised standards or regulations which comply with good engineering practice in safety matters in force within the EU have been applied:

EN 303/5 : 2013
EN 60335-1 : 2012
EN 60335-2-102 : 2016
2014 / 68 / EU
2015 / 1187 / EU

As manufacture and/or authorised representative within EU, we declare under our sole responsibility that the equipments follow the essential requirements foreseen by the above mentioned regulations

Signed for and on behalf of the manufacturer by:

Murat Gedik [Sales Consultant]
Bursa, May 4th, 2020



1 INTRODUCTION AND DELIVERY

Eco-burn is a welded steel boiler for solid fuels which is constructed in advanced three pass horizontal flue gas circulation principle. It is designed for hot water heating systems, therefore should not be used for direct sanitary water supply. Eco-burn fires your fuel with very high water efficiency, saving on your fuel cost. As it can hold high amount of fuel, and the heat exchanger is integrated with horizontal water buffers, it can maintain sufficient outlet water temperatures until all fuel in the combustion chamber is consumed.

Your boiler can be used either in forced or natural water circulation systems thanks to its large waterways inside the boiler and medium sized delivery and return connections. You can fire different solid fuels whose specifications are given further in this manual. As calorific values of solid fuel types differ from each other, the output power of the boiler will vary between a maximum and a minimum range specified.

Delivery term: Eco-burn is delivered in one package with insulation boards and external cabinets attached on the boiler. Mechanical type thermostatic controller is going to be installed on the boiler during installation on site.

Optional accessory: A safety heat exchanger kitted against overheating should be purchased. This kit holds a copper heat exchanger against excessive heat accumulation inside the boiler, a safety valve to activate the heating system at high water temperatures, and auxiliary accessories for installation. Whether the hydraulic circuit is open vented or pressurised, this safety heat exchanger system should be utilized for meeting the regulations of related European standard for this product, as well as safety of whole heating installation and boiler itself.

2 SAFETY WARNINGS

2.1 Basic safety instructions

- Never get yourself into danger; give own safety the utmost priority.
- Keep children away from the boiler room and fuel storage room.
- Observe all instructions related to operation, maintenance, servicing and cleaning.
- Heating system and boiler should only be installed and started up for the first time by an authorised installer. Professional installation and start-up are essential for safe and economical operation.
- Never make any changes to the heating system or flue gas system.
- Never close or remove safety valves.

2.2 Warning signs

DANGER - Risk of poisoning
<ul style="list-style-type: none">• Make sure that the boiler is supplied with sufficient combustion air. The openings in the combustion air inlet must never be partially or completely closed.• Ventilation systems, central vacuum cleaning systems, extractor fans, air conditioning systems, flue gas blowers, dryers or similar equipment must never be allowed to draw air from the boiler room• The boiler must be connected tight to the chimney using a flue gas tube.• Clean the chimney and the flue gas tube at regular intervals.• Boiler room must be sufficiently supplied with air and ventilated.

DANGER - Risk of electric shock

- Switch off any component on the system before performing work on the boiler.
- ALL ELECTRICAL APPLIANCES ON HEATING SYSTEM MUST BE EARTHED !

DANGER - Risk of explosion

- Never burn petrol, diesel, engine oil or other explosive materials in the boiler or storage room
- Never use liquids or chemicals to ignite the fuel
- Switch off the heating system before any work on boiler or heating system

DANGER - Risk of fire

- Do not store any flammable materials in the boiler room.
- Do not hang out any washing in the boiler room.
- Always keep all boiler doors closed during operation
- Store fuels in another room, or leave a minimum distance of 80 cm between boiler and fuel pile.

WARNING - Risk of burns

- Do not touch the flue spigot or the flue gas tube.
- Do not touch boiler hot surfaces (front upper and front door when boiler is hot. Use only door handles. Use gloves for performing all work and fuel loading
- Do not open ash door reach into the ash chamber.
- Do not clean the boiler until it has been allowed to cool down.

NOTICE

Damage to property

- Do not feed cold water directly to the boiler overheated by any reason. This may result in noise production in the system and/or permanent damage on boiler body.
- Do not drain water in hydraulic circuit unless in case of maintenance or risk of freezing
- Heat the boiler using fuels that comply with the specifications below
- Do not use the heating system if it, or any of its components, come into contact with water.
- If any damage occurs, have the heating system checked by your authorised service staff or approved technicians, and have any damaged parts replaced in case needed.

2.3. What to do in an emergency

What to do in the event of a fire

- Switch off the heating system.
- Call the fire brigade
- Use approved fire extinguishers.

What to do if you smell smoke

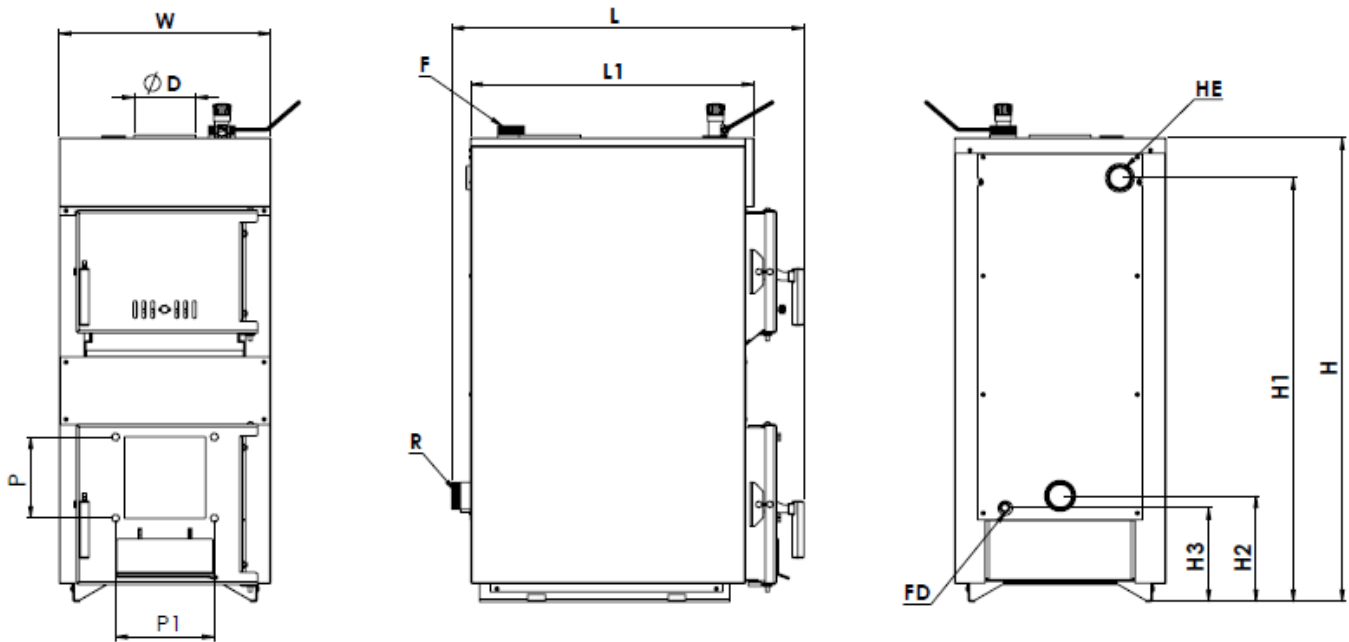
- Switch off the heating system.
- Close the doors leading to living areas.
- Ventilate the boiler room.

3 TECHNICAL DATA

Model		ECO-BURN					
Types		EC 20	EC 28	EC 35	EC 45	EC 60	EC 75
Description of boiler		Manually stocked, welded steel boilers, for solid fuels in 3pass flue circulation principle					
Output (wood, hard coal, lignite)	kW	20	28	35	45	60	75
Water content	lt	56	64	74	84	104	118
Net weight	kg	180	205	220	250	290	340
Total heating surface	m ²	2,0	2,3	2,8	3,3	4,0	4,8
Combustion chamber dimensions							
	Height	490			505		
	Width	330		420		480	
	Length	360	500		600		740
Combustion chamber volume	dm ³	58,0	81,0	103,0	123,0	145	179
Fuel loading clearance (upper door)	mmxmm	330 x 215		420 x 215		480 x 265	
Maximum fuel loading height	mm	400					
Boiler body construction		Steel welded (S 235 JR)					
Boiler bottom grade construction		Cast iron (EN G.JL 200)					
Fuel loading		Manual					
Flue circulation principle		Horizontal three pass					
Output control		Thermostatic					
Requested draught in chimney	Pa	12-16	14-18	16-22	20-30	25-35	35-40
	mbar	0,12-0,16	0,14-0,18	0,16-0,22	0,20-0,30	0,25-0,35	0,35-0,40
Temperature control range	C	50 - 90					
Maximum operating temperature	C	100					
Minimum return temperature	C	50 (recommended)					
Safety system activated at	C	95					
Maximum operating pressure	bar	2,5					
Flow/return connections (F/R)	R	2 "					
Connection for cooling loop (HE)	R	1 1/2"					
Filling / draining connection (FD)	R	1/2"					
External dimensions							
	H	mm			1060		1150
	H1	mm			970		1070
	H2	mm			230		
	H3	mm			215		
	W	mm		482		572	632
	L	mm		662		802	902
	L1	mm		506		646	746
	Flue outlet (D)	mm		140		160	180
Matchnig pellet burners							
Pellet burner assembly dimensions	P	mm		185		185	185
Pellet burner assembly dimensions	P1	mm		225		225	165
Max burner head size	mm	180 x 180		180 x 180		180 x 225	
Max burner tube length	mm	240		320		370	

Fuel type		Wood					
Maximum fuel charge	kg	23	26	34	41	54	66
Requested fuel parameters		Maximum water content 20% Maximum cross section 10 cm x 10 cm Average calorific value 17.000 - 20.000 kJ/kg					
Flue gas mass flow	g/s	21,7	26,4	33,0	42,4	56,5	70,5

Fuel type		Hard coal, lignite					
Maximum fuel charge	kg	30	35	45	55	73	90
Requested fuel parameters		Maximum water content 15% Average size between 30 to 60 mm Average calorific value 26.000 - 30.000 kJ/kg					
Flue gas mass flow	g/s	32,5	39,6	49,5	63,6	84,5	105,6



You can install a pellet burner on your boiler. Pellet burner door should be purchased from the boiler supplier. Before any purchase, first check if pellet boiler you find in the market fits your boiler, see the sketch above on the left. Maximum burner tube diameter you can fit on this boiler is 160 mm for EC 20 to 45. Burner must be installed and operated in accordance with burner manufacturer's regulations. Any misuse will terminate all warranty terms given by boiler manufacturer

4 BEFORE INSTALLATION

4.1. Handling the product

Eco-burn is a heavy product, and care should be taken when carrying the boiler to the room where it is going to be installed. The total weight of each boiler is indicated in Technical data section. Carrying equipments must be of enough capacity to support that weight.

4.2. Room selection

Eco-burn boiler must be installed in an individual boiler room particularly organized for heating. The boiler room should be of enough volume for installation, firing, and maintenance of the boiler. There should be enough fresh air circulation for combustion, the chimney design must ensure an adequate draught for related boiler type, and must comply with construction criteria given further in this manual and in mandatory regulations. Your boiler must never be installed in open spaces or balconies, in spaces occupied by people like kitchen, living room, bathroom, bedroom, in spaces where there are explosive and combustible materials.

The boiler room should have air ventilation holes through outside to let fresh air in. One air ventilation hole must be built maximum 40 cm below the level of room ceiling, the other must be built maximum 50 cm above the floor level. These ventilation holes should always be kept open. The upper hole should be at least 40x40 cm in size, the lower hole at least 30x30 cm.

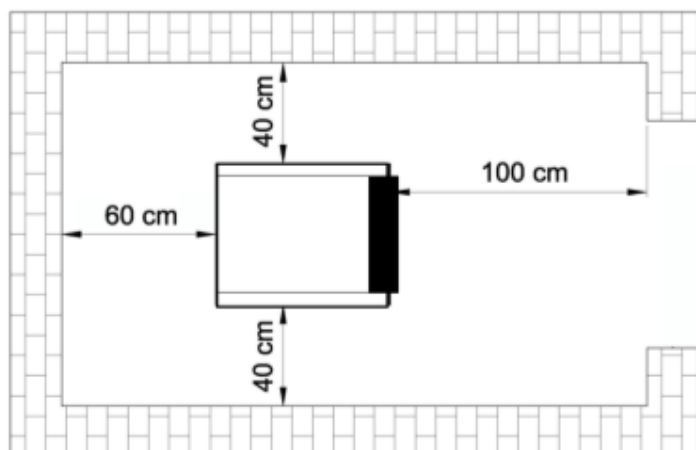
All hydraulic and electrical circuits must be arranged by authorized staff in accordance with mandatory regulations specified by legal organizations. Solid fuels should be stored by keeping minimum 800 mm distance from the boiler. We recommend you to keep the solid fuel in another room.

Boiler should be installed on a concrete plinth made of a fireproof material. For minimum sizes of the plinth following table should be referred

Model	EC 20	EC 28	EC 35	EC 45	EC 60	EC 75
Plinth height (mm)	50					
Plinth width (mm)	490		580		640	
Plinth length (mm)	500	650	650	750	750	900

4.3. Clearances around boiler

At least the following clearances should be achieved around the boiler:



5 INSTALLATION

5.1. Circulation pump

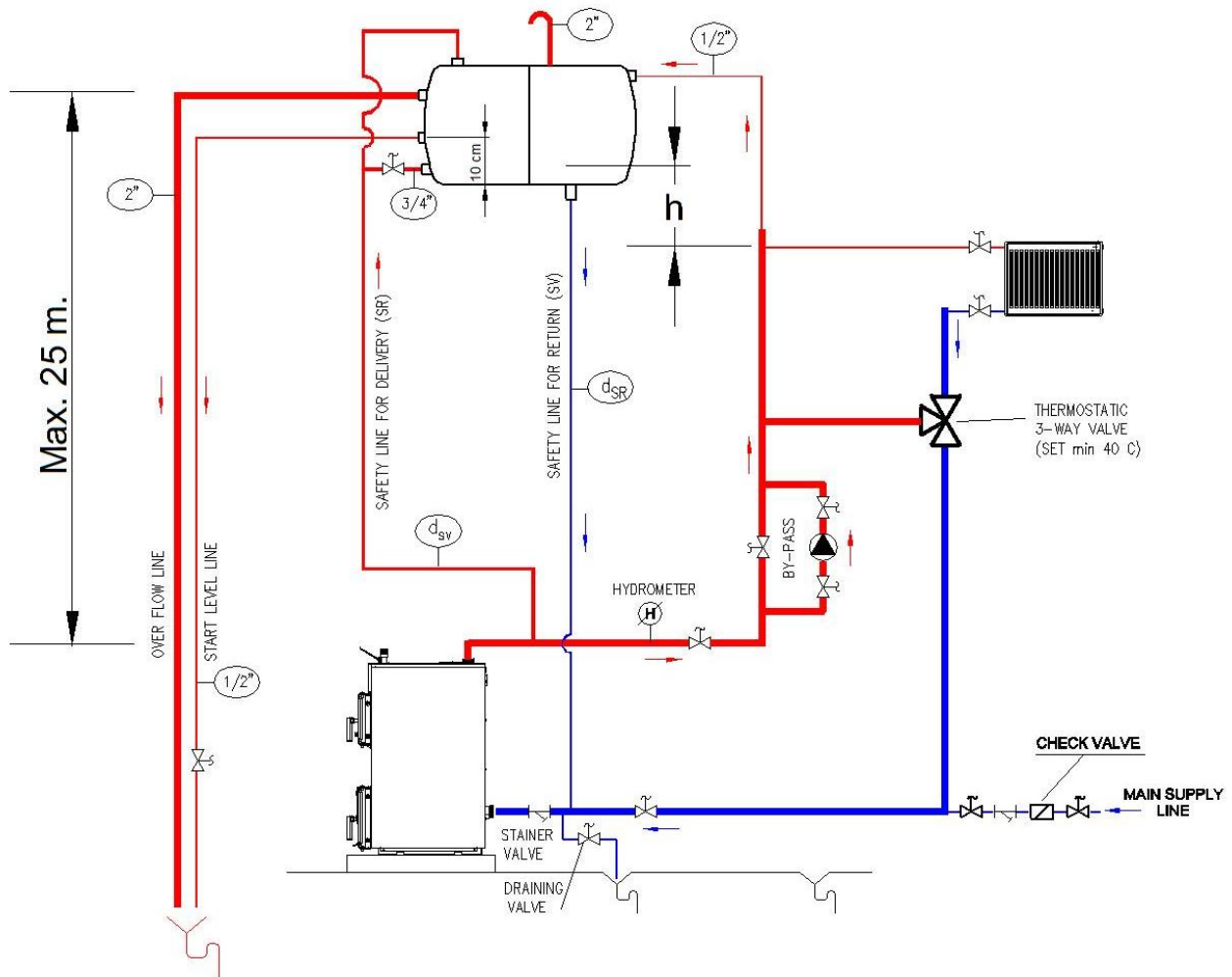
We recommend building a forced water circulation system accompanied with a sufficient pump. Refer to the system diagrams given further in this manual to find the right position of the pump within the hydraulic circuit.

NOTICE

- Your boiler does not switch the pump on and off automatically. That is why, you should keep the pump switched on, when the boiler temperature is above the cold water temperature or there is flame inside the combustion chamber. Never switch the pump off unless the fire is completely off.
- Never let the boiler water temperature reach high values sharply with leaving the pump switched off. In that case, very high thermal energy of return water to boiler could result in permanent damage.

5.2. Open vented hydraulic circuit

Kappa boilers are preferred to be installed in a hydraulic circuit with an open type expansion tank in accordance with the following schemes. The circulation pump may be installed on either delivery or return line of the boiler



Open type expansion tank must be installed at the highest level of whole hydraulic system. No globe valves must be installed on delivery and return safety lines between boiler and expansion tank. Safety lines should be attached to inlet and outlet lines of boiler at points as close as possible to boiler, using the shortest possible vertical way between expansion tank and boiler. If the circulation pump is installed on return line, and the head of pump at maximum speed is "h", the vertical distance (h) given in above scheme must be achieved within the system design (h, being the vertical distance between the top radiator of the circuit and bottom level of open expansion tank). If h is not achieved in such system, there will be air suction on radiators at highest level of circuit. In this case, the pump must be installed on delivery line from boiler.

A hydrometer must be installed on the delivery line to monitor the pressure level and to check if there is any leakage. The hydrometer should be purchased separately, and should be installed at the same level with the boiler outlet. A by-pass line should be installed between inlet and outlet connections of circulation pump in order to allow maximum water delivery when circulation pump is switched off and there is fuel fired in boiler, particularly during sudden electricity cuts off.

NOTICE

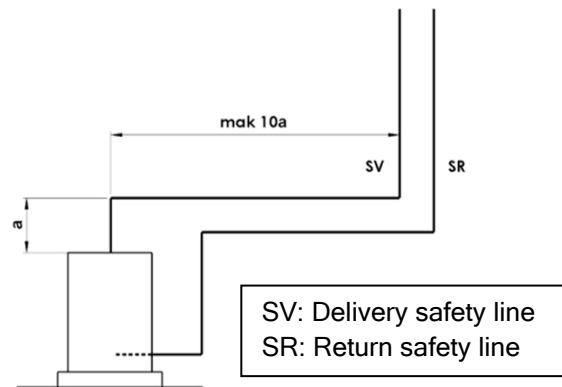
- The optional safety heat exchanger kit is highly recommended to be used with the boiler, even in the case of open vented systems to protect the boiler and the whole heating circuit against excessive heat accumulation. For installation of this kit, please refer to the next section.

NOTICE

- When water temperature in hydraulic circuit is relatively low, particularly when solid fuel is just fired, it is normal for water vapour in flue gases to condense. Condensation rarely creates a problem for the boiler, as it will stop when boiler becomes hot. However, the boiler should not be operated in fully condensing mode. When you open loading door, if chamber walls are wet, it means that there is condensation in flue gases. Continuous condensation does not only create massive tarrs on combustion chamber heating surfaces, but also has little effect on boiler lifetime. We will recommend you to follow one of the following methods to control condensation rate in the boiler:
 - You can install a thermostatic three way mixing valve between delivery and return line of the boiler as described in above circuit scheme. Here, three way valve should preferably be set to 40 °C. Then, water will by-pass directly between delivery and return of the boiler, until the return water temperature reaches up to 40 °C.
 - You can control circulation pump by means of a thermostat that can be attached delivery or return of the boiler. If thermostat is on the return line, it should be set to 40 °C, if it is on the delivery side, set to 55 - 60 °C. As the pump will not start unless water temperature rise up to the set value, boiler warms faster, and condensation mode is minimized.

5.3. Design parameters for open expansion tank

Expansion tank protects hydraulic circuit from excessive temperatures by allowing free volume for expanding water and keeping the water pressure from exceeding the static pressure. Expansion tank may be built in rectangular prism or cylindrical shape, may be installed in horizontal or vertical position in the system. Safety lines between boiler and expansion tank should be installed by an increasing slope up to tank. Following scheme shows the maximum vertical distances between safety lines and boiler:



The size of expansion tank can easily be calculated regarding the total expanding water contained in whole system. If the total volume of water in the system is V_s ; the volume of expansion tank should be:

$$V_g = 8 \cdot V_s / 100 \text{ (in litres)}$$

In more practical way, just using the nominal heat output of boiler (Q_k) in terms of kW, the volume of expansion tank can be calculated as;

$$V_g = 2,15 \cdot Q_k \text{ (in litres)}$$

Size of the safety line for delivery (in mm)

$$d_{SV} = 15 + 1,5 \cdot \sqrt{Q_k}$$

Size of the safety line for return

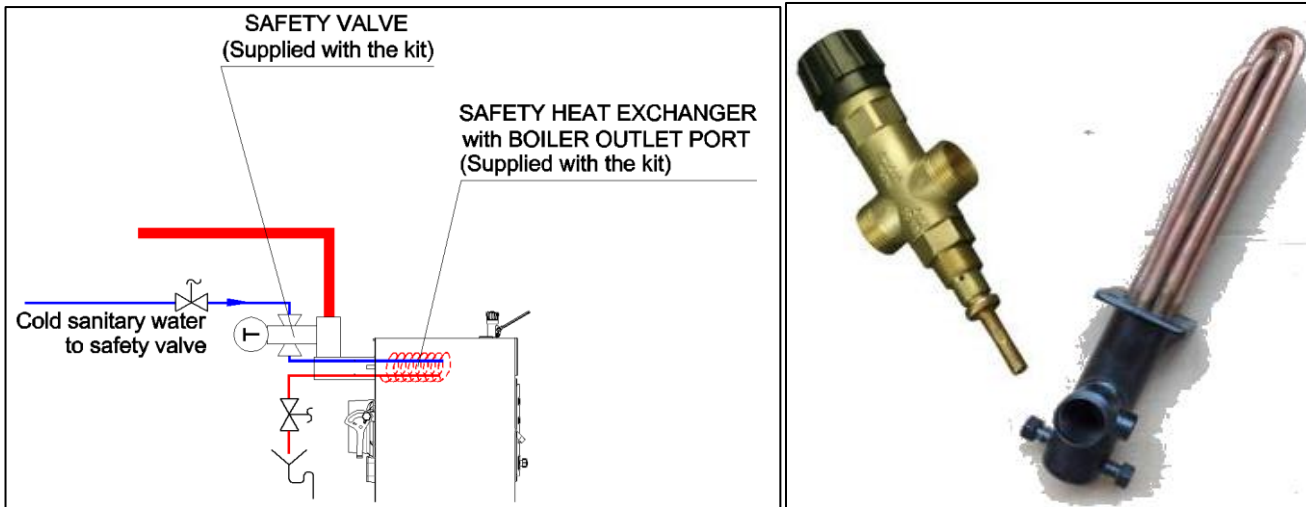
$$d_{SR} = 15 + \sqrt{Q_k}$$

where Q_k is the boiler output in kW.

5.4. Additional safety against over-heating

To ensure safety against high temperatures on boiler and heating system, a cooling loop (safety heat exchanger) with activating valve must be installed. Safety heat exchanger includes the following items:

1. Safety heat exchanger (copper serpentine integrated with outlet stub pipe)
2. Safety valve
3. Auxiliary fittings / flexible hose



If the boiler water temperature exceeds 95 °C, thermostat of the safety valve lets cold sanitary water flows through the serpentine of the safety heat exchanger. Serpentine with cold water circulating inside cools down the boiler water temperature. When the boiler temperature decreases below the safe degree, safety valve shuts the cold sanitary water circulation, and the boiler goes back to normal operation.

NOTICE

- The valves on the sanitary connections of safety heat exchanger must always be kept open.
- Boiler can only be used with original safety heat exchanger kit which is tested and approved for each boiler model. The safety valve could be purchased separately if it is not included in the kit.
- Cold water must never be delivered directly to boiler inlet in order to solve overheating problems as this will result in serious damage on boiler body. That application will end the warranty of the boiler.

5.5. Warning on water level in system

After first water make-up in the system, minimum water level must be marked on hydrometer for open vented circuits, minimum water pressure level must be marked on manometer for pressurized circuits. Water level or pressure should be checked daily, and water should added to circuit if they are below the minimum value. During first water make-up, oxygen must be fully discharged from the system. Generally, oxidation will not be a problem, if all measures are taken into account during first water make-up. Oxidation will take place because of fresh water addition to the system during operation of the boiler. The main reasons are as follows:

1. In open vented systems, oxygen will be added as expansion tank is open to atmosphere. That is why, open expansion tank sizes, its position in the system, safety connections to and from, are very important, and instructions given in this manual for open vented systems should be followed carefully.
2. Leak points in a system will cause oxygen to be absorbed inside the heating water. For this reason, minimum water pressure in a pressurized heating circuit must be above atmospheric pressure. Besides, pressure level should always be checked periodically.

5.6. Precautions for new installations:

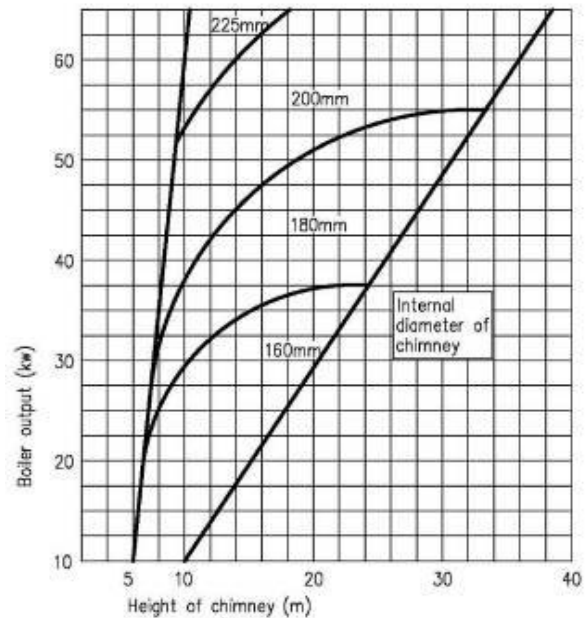
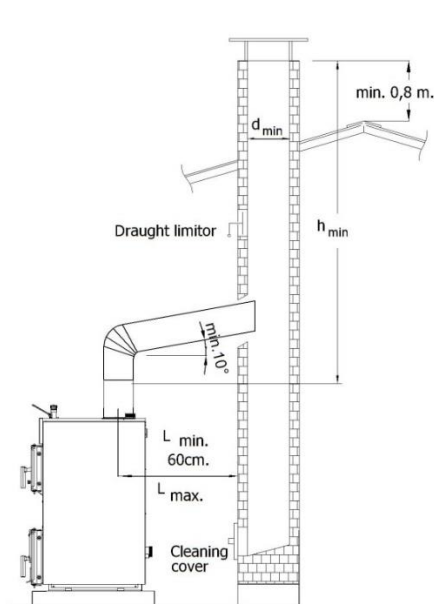
System should be sized and designed accordingly, in order to minimize fresh water addition. Make sure that no part of the system is made of material that is permeable to gases. The original system filling water and any topping-up water must always be filtered (using synthetic or metal mesh filters with a filtration rating of no less than 50 microns) to prevent sludge from forming and triggering deposit induced corrosion.

5.7. Chimney connection

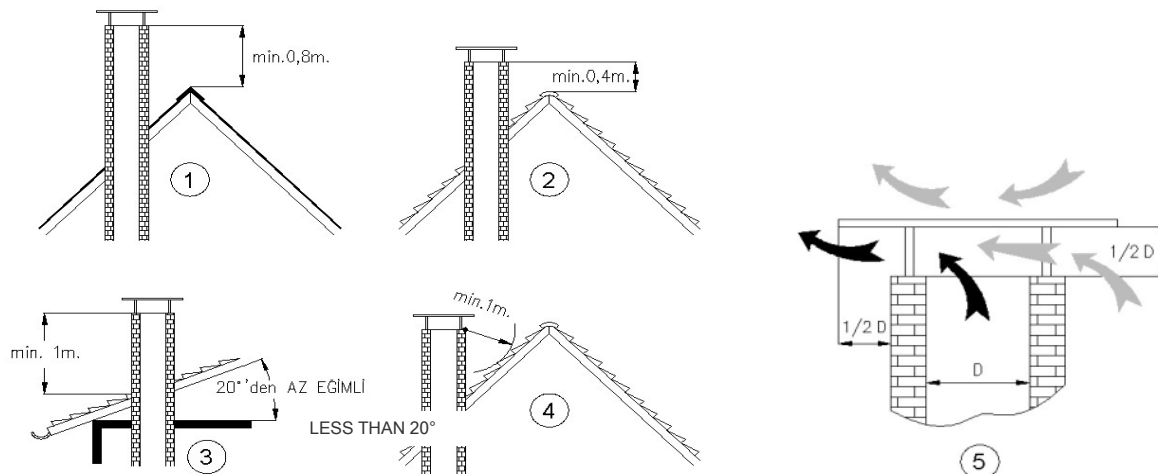
Your boiler must be connected to an individual chimney that will provide at least the minimum draught requested. The flue canal between the boiler and the chimney should be insulated using a glass wool material. The flue canal to chimney and chimney must be made of steel or an equivalent material that can be used at temperatures around 400 °C.

All connections on flue system must be sealed in order to perform a good combustion and efficiency. The flue canal must be connected to the chimney using the shortest way possible and in accordance with the dimensions given in the following scheme. Horizontal connections and equipments that will increase the pressure loss such as elbows should be avoided. A vertical single steel piping should not be used as a chimney. Chimney must be made of one internal and one external surface. External surface may be made of steel or brick. For internal surface stainless steel chimney elements should be preferred against corrosion. The space between internal and external surfaces of the chimney must be insulated to prevent condensation in flue gasses.

At the lowest level of chimney, there should be a cleaning cover which is made of steel, and sealed for any leakage. The length of flue canal between the boiler and the chimney should not exceed $\frac{1}{4}$ height of chimney.



Highest level of chimney outside should be in accordance with the dimensions given in following sketch so as to minimize the harmful effect of flue gasses on ambient, and to improve draught in chimney.

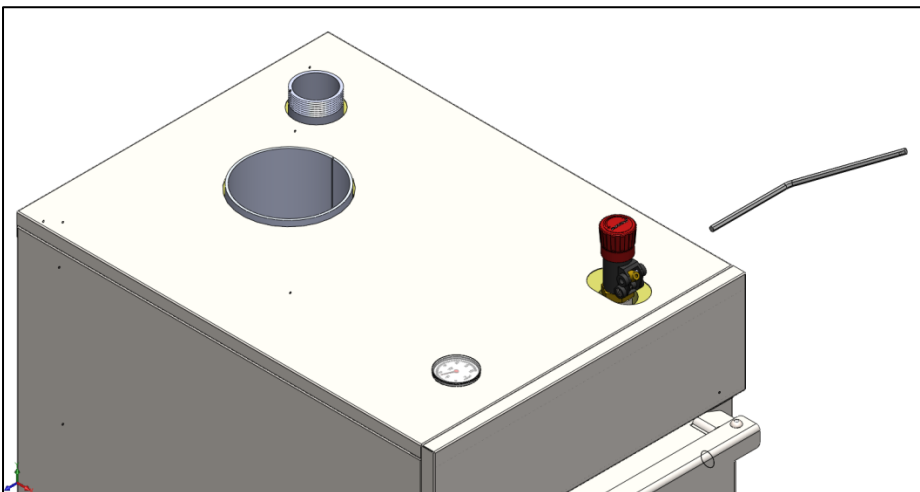
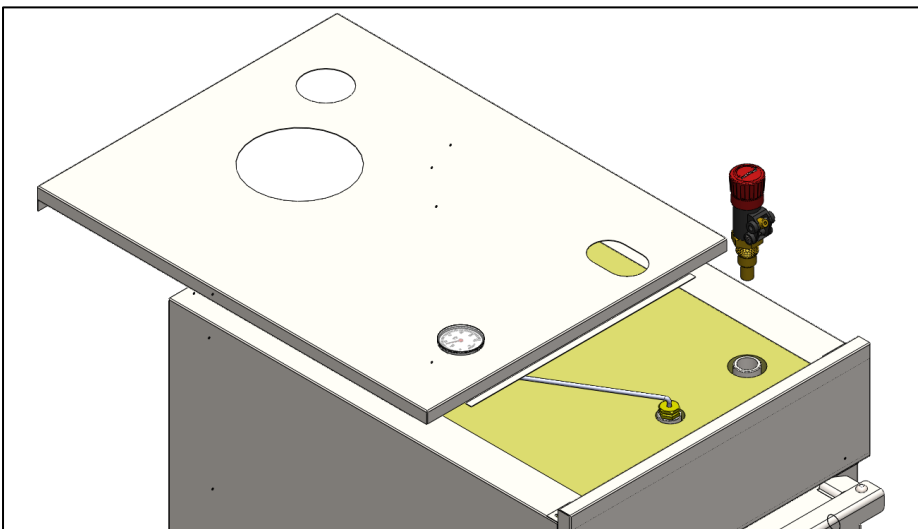


6 ASSEMBLY INSTRUCTIONS

6.1. Boiler accessories

Follow the instructions to finish the assembly of boiler accessories supplied together with the boiler

1. Remove the top panel of the boiler, and install the thermo-regulator into 3/4" port at top of boiler body.
2. Place top panel into its original position, check that thermometer bulb is on the right position, and secure top panel to side panel using the same screws.
- 3.. Attach thermo-regulator arm onto thermo-regulator passing it through the corresponding hole as seen on following pictures. Then, secure it using the screw on thermo-regulator body.
4. Attach thermo-regulator chain supplied within its package between the end of thermo-regulator arm and primary air entrance damper on front lower (ash) door.



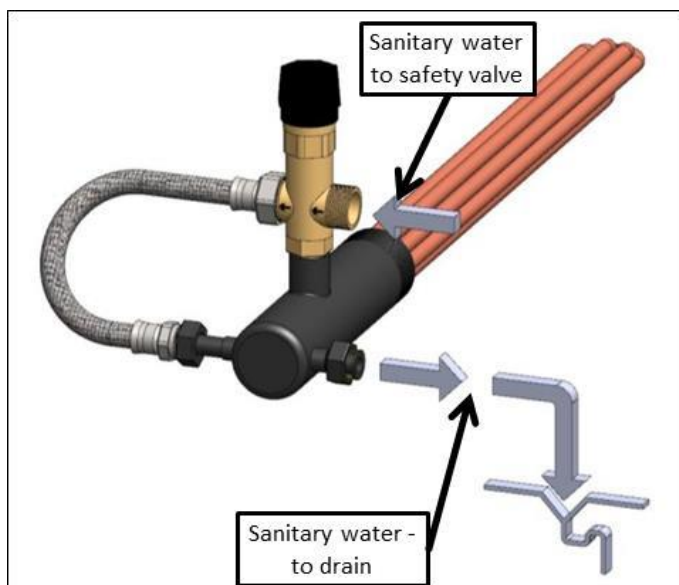
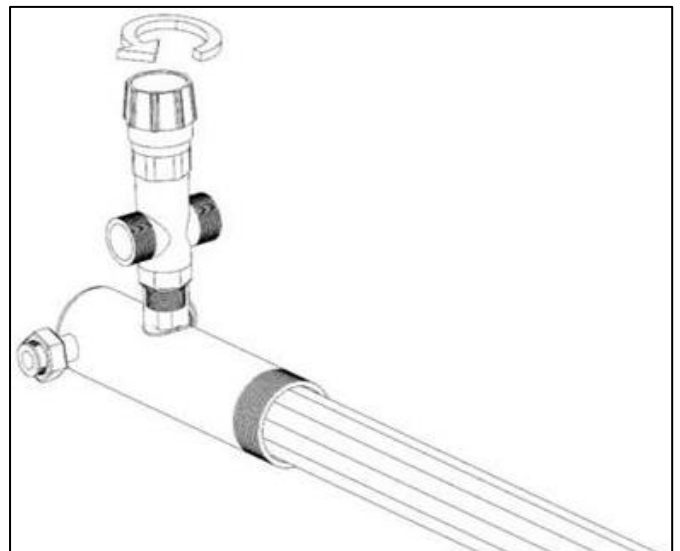
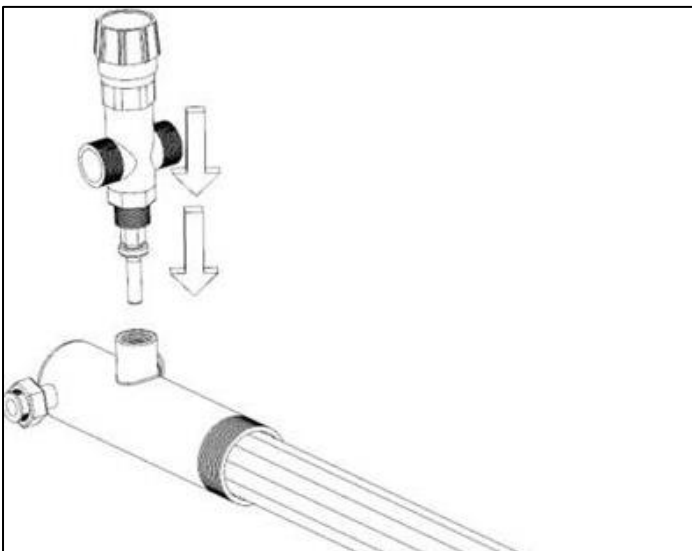
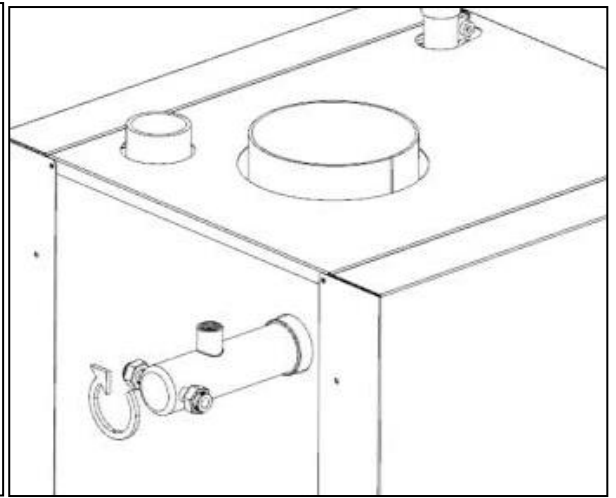
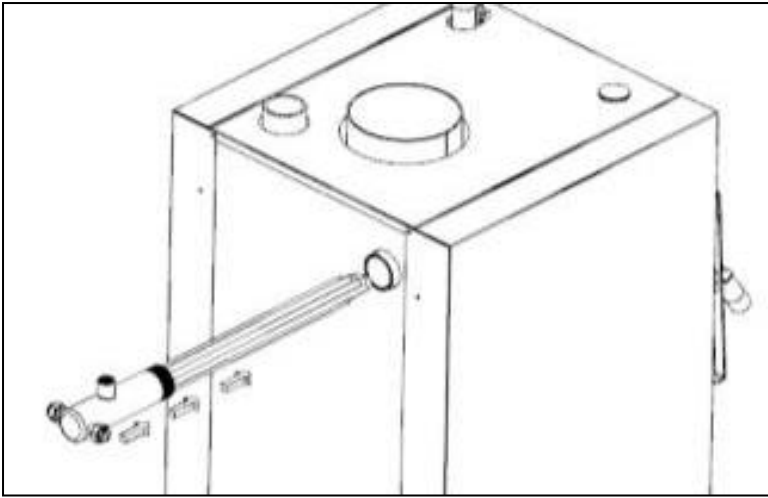
6.2. Safety exchanger

1. Install the safety heat exchanger into the 1 1/2" port on upper right hand side at the back of the boiler. After the installation 1/2" port which is going to be used for safety valve installation should be positioned at the top.

2. Install the Regulus JBV-1 safety valve into 1/2" port.

3. Attach the flexible connection hose supplied with the kit between outlet port of safety valve and one of ports of safety valve in respect with the flow direction shown on safety valve body.

4. Finally, attach cold water supply line to inlet port of safety valve, and drain the other port of the safety heat exchanger.



7 OPERATING INSTRUCTIONS

7.1. Setting thermo-regulator (thermostatic controller for combustion air)

Mechanic type thermo-regulator is mounted on front side of boiler in horizontal position. In horizontal operation of thermo-regulator, white coloured numbers show the requested heating temperatures. After assembly of thermo-regulator body, place the lifting rod for regulator.

Load the boiler and fire. Wait until the boiler temperature reaches 60 °C. Set the thermo-regulator to 60 °C. Attach one end of thermo-regulator chain to primary air damper. Attach the other end the chain to lifting rod of thermo-regulator, and stretch the chain, leaving 2 mm space between primary damper and air inlet of front door.

7.2. Pre-firing checks

Before first operation of boiler right after installation, hydraulic circuit must be ready for operation. To fill an open vented circuit, the valve on start level line from expansion tank is opened, and the circuit is filled with main supply water. During filling the system all valves and accessories on the lines must be checked for leakage. Filling is stopped, when water from start level line is observed, closing the valve on this line. Right after that, hydraulic pressure is marked on screen of the hydrometer. This will make re-filling operations during heating season much easier, just feeding the system with fresh water until hydraulic pressure on screen reaches the pre-marked value.

Before every firing make sure that;

1. Boiler and circuit are filled with water, and the hydraulic pressure is in the required range.
2. All valves on the line (except by-pass lines and start level line) are in open position.
3. There is enough draught in chimney.

7.3. Firing

1. Set the kindling. Place fire starters, crumpled newspaper (3 or 4 sheets balled up fairly tightly) on the grate of the boiler. Place small kindling over the paper or starter. The more dry, small kindling you have - the easier and better the fire will start. Crisscross the kindling so there is plenty of air space in between each piece. Wood that is packed too tight will not burn properly. Set larger wood on top of the kindling, and continue to set larger and larger pieces on top until the fuel exceeds the 1/3 level of the filling chamber.
2. Ensure that the primary air and chimney dampers are open. Then light the newspaper on the bottom
3. After first ignition, switch the circulation pump on, and adjust air damper. Set mechanic thermo-regulator to desired temperature as explained above
4. The fire should be well established within approximately 15 minutes, then filling chamber can be loaded completely, but check to make sure that the firelighters have not been extinguished.
5. Keep the fire going. Always keep a "flame" on your fire - a smoking or smoldering fire is a cold and inefficient fire and also produces pollutants and creosote (tar in the chimney)

7.4. Firing with wood

When firing wood, you can keep the secondary air damper closed or slightly open in order to extend combustion period.



7.5. Firing with brown coal and lignite

You can keep secondary air damper half to fully open to achieve good combustion and better flue emissions.

7.6. Stand-by

You can slow-down the combustion by

1. Decreasing the set temperature on the thermo-regulator
2. Closing the secondary air damper fully

WARNING

- Your boiler does not switch pump on and off automatically. That is why, you should keep the pump switched on, when the boiler temperature is above the cold water temperature or there is fuel firing inside the combustion chamber. Never switch the pump off unless the fire is completely put off.
- Never let the boiler water temperature reach high values sharply with leaving the pump switched off. In this case, the instant cold water delivery to the very hot boiler may result in cracks on boiler body due to high thermal energy.
- If the thermo-regulator does not operate properly, shift its setting step by step according to your comfort conditions

7.7. Lack of chimney draught

If there is lack on chimney draught or there is no draught at the chimney (such as badly built, un-insulated, blocked etc.) you may face combustion problems (no fire, excessive smoke, condensation due to cold flue gasses). In this case, we strictly recommend you to have your chimney controlled by an expert, and fix any irregularity. Your boiler has been designed for natural draught principle, and that is why, chimney installation is very important.

8 HEALTH AND SAFETY INFORMATIONS

8.1. Control of substances hazardous to user health

For the type of material and where used in your boiler refer to the following chart

1. PAINTS:

General purpose black undercoat	NOT APPLICABLE
High temperature black coating	Boiler body Boiler doors
Powder coating	All external panels

2. INSULATION AND SEALS

Rock-wool insulation board	NOT APPLICABLE
Glass-wool insulation board	Boiler body Front and rear panels
Fibre-glass rope and tape	Front door
Ceramic-fibre board	Front door
CFC free polyurethane spray/foam	NOT APPLICABLE
Refractory brick	NOT APPLICABLE
Asbestos products	NOT APPLICABLE

3. SEALANTS

High temperature adhesive	Front doors
Fire cement	NOT APPLICABLE
Gas jointing compound	NOT APPLICABLE

NOTICE

Paints, sealants, ceramic-fibre boards

1. These materials contain organic solvents and should be used in well-ventilated area away from naked flames. Do not allow to come into contact with the skin, eyes, inhale or swallow.
3. Use barrier cream or gloves to protect the skin, and goggles to protect the eyes from accidental contact.
4. Small quantities can be removed from clothes or skin with a proprietary paint remover or hand cleaning product.
5. If inhaled, remove sufferer into fresh air, if swallowed clean mouth with and drink fresh water but do not induce vomiting. If in the eye, irrigate the eye with clean water and seek medical attention.

NOTICE

Devices under pressure

1. Avoid contact with the parts of heating system under pressure during operation of the boiler. These dangerous parts are:
 - Boiler body
 - Boiler inlet and outlet lines
 - Safety lines
 - Pressure relief devices installed on heating system
2. Never attempt to drain water from heating system when the boiler is being operated
3. Never feed the boiler directly with cold water to cool it down for any reason, when the boiler is hot.

WARNING on high temperature surfaces

Avoid contact with parts and surfaces having high temperatures (working surfaces) which will be hazardous for human such as:

1. Boiler front doors
2. Ash door
3. Water delivery and return lines (even if isolated), safety lines
4. Flue spigot
5. Connection between flue outlet and chimney
6. Circulator pumps, expansion vessels

NOTICE

Flue gases

1. There could be a little gas release from the front side of the boiler, when the front loading door is opened. Never breathe this gas flow.
2. When adding solid fuel when there is active fire bed inside the combustion chamber, protect your hands and face..If needed wear protective gloves.

NOTICE

Firing fuel

1. Do not take the firing fuel out from the combustion chamber while it is still burning
2. Do not try to put the firing fuel off using water or any other liquids.
3. Do not leave the front doors and fire door open when there is fire inside the combustion chamber
4. To slow down or stop the fire, close air inlets, and flue outlets..
5. Your boiler can only be fired with the solid fuels whose characteristics have been given in Technical data section. Never use any other solid fuel that would be harmful for boiler section design, any liquid or gaseous fuels.

9 MAINTENANCE AND CLEANING

9.1. Periodic inspections

- * Check the water level or pressure. The hydrometer must be marked after first filling of the boiler. So water level can be checked regularly. If the water level or pressure is under the level of static pressure or the system set-up, a water make-up is needed. The make-up water should be softened according the local regulations before feeding into the system to prevent corrosion inside the heating circuit and the boiler.
- * Front doors of the boiler should be checked for properly closing. Fibre-glass ropes must be replaced if necessary.
- * Check if there is flue gas leakage from the chimney connections of the boiler, and have it fixed if necessary.
- * Check correct operation of thermo-regulator on top of the boiler. If needed you can slightly shift the setting of thermo-regulator for better combustion for your boiler capacity. If air is not enough for combustion, there will be excessive soot formation on heating surfaces, as well as fumes (or odours). So you should let more air re-adjusting the primary air damper setting to get richer combustion. If air is too much for combustion, solid fuel will be consumed rapidly. In this case we recommend to reduce air inlet by either primary air, or flue damper on the smoke-hood.
- * Check the heat transfer surfaces of heat exchanger. The soot formation will change according to fuel type you use, and the combustion air amount. So if you feel that the outlet water temperature cannot reach the usual values with the same conditions, heating surfaces therefore should be cleaned

9.2 Boiler cleaning

Before cleaning the boiler, switch the pump and other electrical appliances in boiler room off. To clean the boiler:

- * Clean all heating surfaces using the brush supplied with the boiler.
- * Move back deposits towards the smoke-hood if you cannot brush them forward
- * Clean the fresh air inlet section at the bottom level of intermediate sections with supplied fuel poker
- * Collect all soot deposits inside the ash tray
- * Remove the disposals collected in ash tray.

9.3. Maintenance

Before each heating season we would recommend you to call for the contracted service agent to check the boiler, heating system, electrical connections, and chimney conditions. Do not attempt to carry any maintenance work without getting help from qualified people.

START-UP / COMMISSIONING FORM

1/2

END-USER INFORMATION

NAME / SURNAME	:	_____
ADDRESS	:	_____
CITY / PROVINCE	:	_____
COUNTRY	:	_____
E-MAIL / GSM	:	_____
SIGNATURE	:	_____

PRODUCT INFORMATION

PRODUCT MODEL	:	_____
EXTRAS 1	:	_____
EXTRAS 2	:	_____
INVOICE DATE and NUMBER	:	_____
SERIAL NUMBER	:	_____

COMMISSIONING OF THE DEVICE

DATE OF COMMISSIONING	:	_____
AUTHORIZED COMPANY for COMMISSIONING	:	_____
ADDRESS	:	_____
E-MAIL / GSM	:	_____
SERVISER NAME / SURNAME	:	_____
SERVISER STAMP and SIGNATURE	:	_____

- Warranty period is 2 (two) years, and starts with signing of this document
- One copy of this document shall be handed to end-user
- General checks on next page should be completed for future reference

START-UP / COMMISSIONING FORM

2/2

General Checks	Check	Comments
Wall plug voltage measurement	_____ V (AC)	
There is no damage because of transportation		
Chimney is clean, functioning well and meets the requirements defined in manuals		
Outputs are tested before start-up and working correctly		
Plumbing plant installation is made according to manuals, and necessary sensors are installed		
Optimization for auger / chimney calibration (if needed) is made		
Purchased optional elements are installed correctly, and tested		

End-User Notification	Check	Comments
User is informed about boiler/stove cleaning and service cycles		
User is informed about errors and how to act when they are shown		
User is informed about combustion power selection and setting necessary thermostats		
User is informed about boiler/stove functioning, operating, fuel quality and warranty conditions		

REMARKS / DIFFERENCES