Residential space-heater for wood pellet with central heating

HELENA AQUA

Technical manual for use and maintenance

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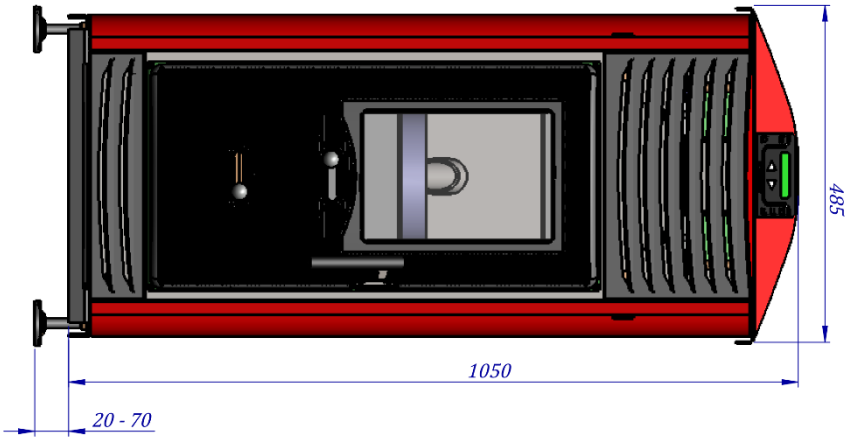
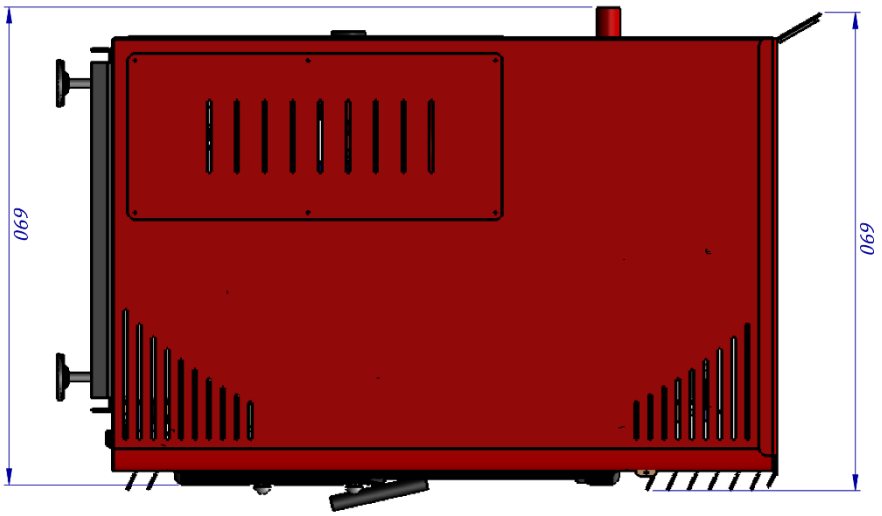
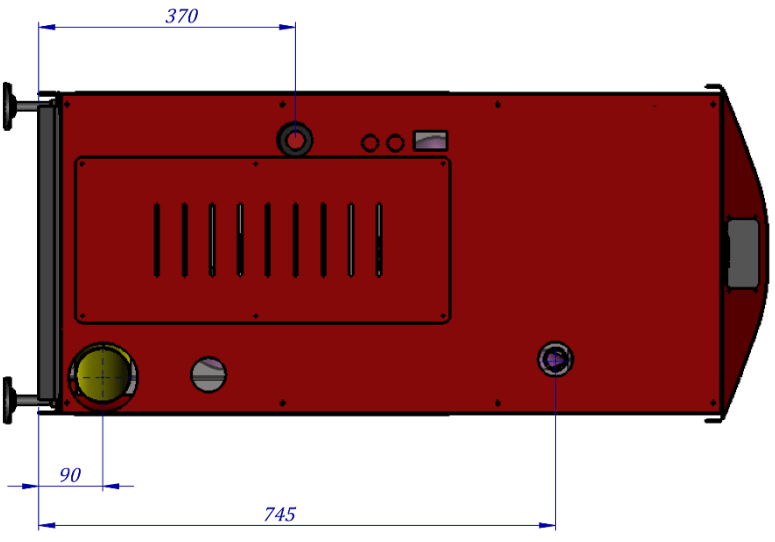






1.1 Technical data chart

Type	**HELENA AQUA**
Nominal power	10 KW
Power transmitted to the central heating	8 KW
Temperature range	60- 80 °C
Minimum temperature of the return line	50 °C
Fuel consumption at minimum power	min 1,0 kg/h
Fuel consumption at maximum power	max 1,5 kg/h
Pellet quality	A1, A2 Ø6, Ø8
Total weight of the boiler	178 kg
Weight of the cast-iron door	15 kg
Maximum working pressure	**1,5 bar**
Pellet capacity	12 kg
Flow / Return (inch)	1"
Fill / Drain tap (inch)	1/2"
Flue gas diameter	80 mm
Air inlet opening	50 mm
Flue gas temperature at nominal power	140 °C
Necessary draught	8 Pa
Boiler water volume	11 lit
Connection to electrical network	220 V 50 Hz
Energy consumption at start-up	400 W
Energy consumption at steady-state	100 W
Boiler class efficiency	5
Boiler class emissions	5

1.2 Emision values

Helena AQUA wood pellet space heater with central heating is evaluated according to European Directive 2015 :1189 and its emission values as well as boiler efficiency are officially tested and confirmed to be below prescribed limits.

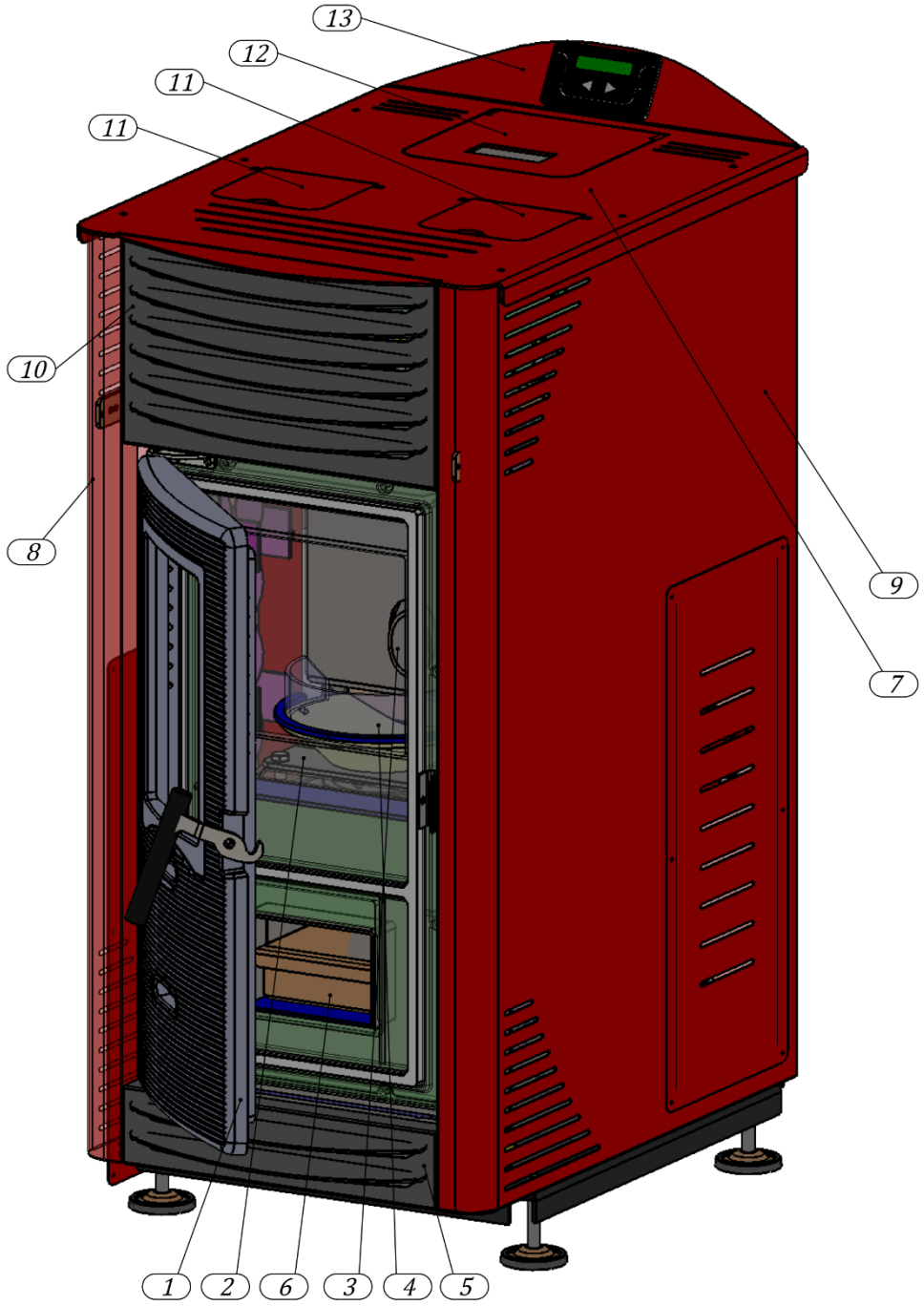
Seasonals emissions	at 13% O_2
CO	0,0199 %
OGC	33 mg/m^3_n
Dust	18 mg/m^3_n
NOx	75 mg/m^3_n
Seasonal efficiency	81,8%
Energy efficiency index	123
Energy efficiency class	A+

1.3 Description of the product

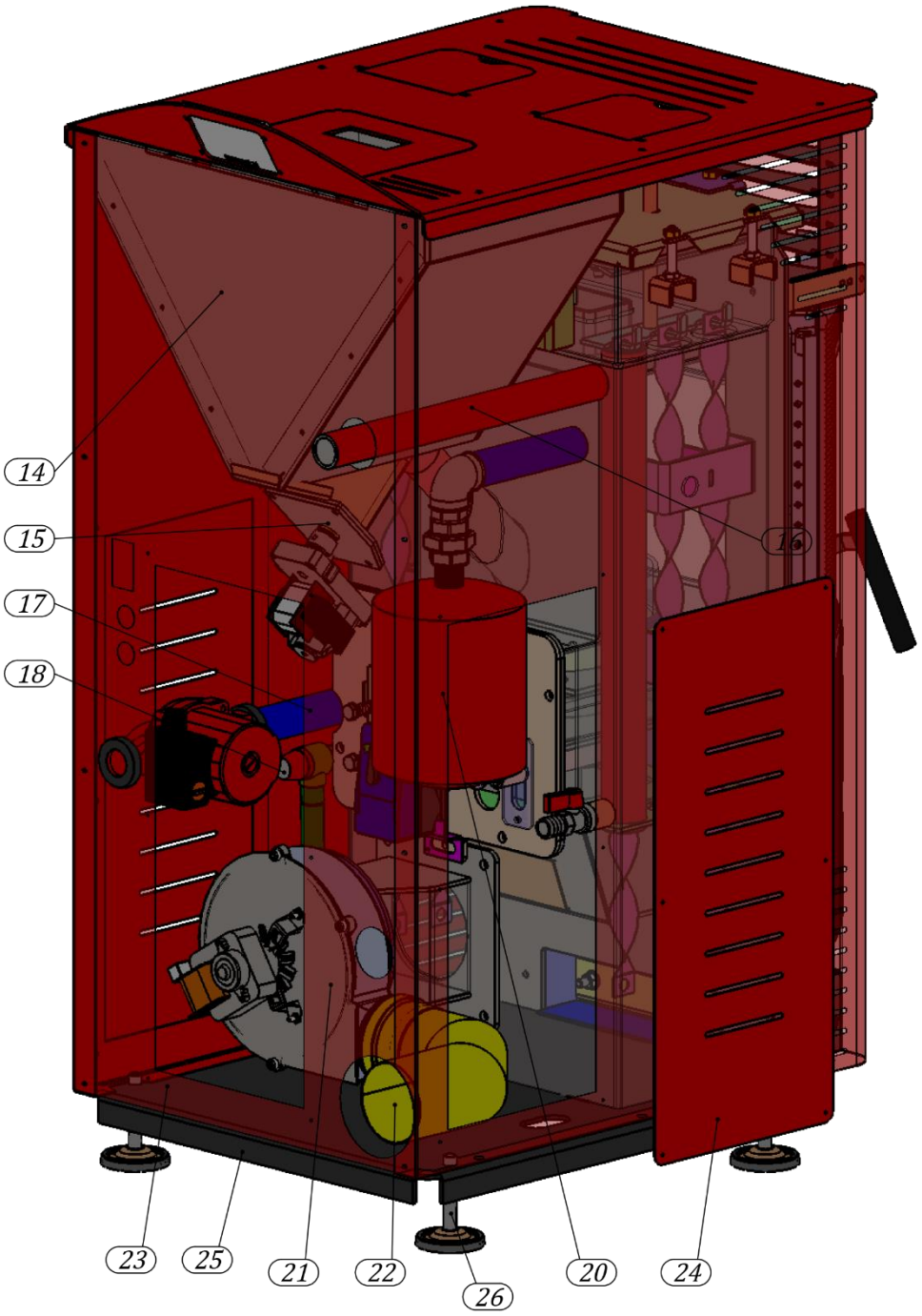
- This product is aimed for living areas. It's a space-heater device so it has no thermical insulation coat. Product dimensions make it suitable for placement in small areas.
- **Helena AQUA** wood pellet space-heater is made according to **EN 14785** and fulfills **Ecodesign** criteria 2015:1189.
- This product can only be fed and fired with **wood pellets that fulfill EN 14961 norm**, pellet quality A1 or A2, pellet diameter 6mm or 8mm.

- The boiler has an expansion vessel of **8 litres**. Boiler comes with a circulation pump and safety valve inside (beneath the back cover). Air vent is not included.
- Original rotating burner design is enlisted at European design registry **EUIPO**.
- Ignition, start-up and turning-off are fully automatized. Combustion control is optimized using algorithms such as 'modulation' which automatically decreases pellet dose as the difference between desired and reached temperature is decreasing.
- Boiler regulation is equipped with sensors (hot-water, flue gas). A smart PID boiler regulation can „recognize" the caloric value of the pellets.
- It is also equipped with two gear motors (dosing, burner bottom rotation).
- Boiler chamber is made by welding 5mm thick steel plates (all surfaces in touch with fire). Other parts are made of 4mm steel.
- Working principle of this boiler is based on the "sub-pressure" of the heating chamber. The chamber is completely air-proof so that air flow in the boiler is fully controlled by the exhausting fan mounted on the back. Boiler regulation completely controls the quantity of the air inside the heating chamber: optimum combustion comes as a result.
- Pellets are fed to boiler via internal transporter screw inside the storage tank. From there pellets are fed over to heating chamber where they fall free to the designated melting area (the 'actual' embedded burner of the boiler). Storage and melting area are physically divided. There is a safety thermostat to prevent back-fire. There is also a pressure sensor inside the heating chamber - when the boiler door is open, this sensor will react and stop the feeding process.

2 Parts of the space-heater HELENA AQUA



1. Cast iron door 2. Embedded pellet burner 3. Pellet doser 4. Burner Ring 5. Boiler housing - lower opening 6. Ashtray 7. Boiler housing - upper part 8. Boiler housing - left side 9. Boiler housing - right side 10. Boiler housing - upper front part 11. Cover of tubulators handles 12. Pellet magazine cover 13. Boiler housing - display carrier



14. Pellet magazine 15. Pellet feeding auger with motor 16. Flow line 17. Circulation pump 18. Safety valve 19. Filling tap 20. Expansion vessel 21. Boiler fan 22. Flue line element 23. Boiler housing - back 24. Service access plate 25. Boiler basement 26. Boiler legs (adjustable)

3 Recommandations for shipment and storage

3.1 Delivery

 Make sure product is during transport always placed in its vertical position.

 Turning boiler upside-down can seriously damage the unit.

 It is forbidden to stack products.

 Product can be storaged only in closed area without atmosferic influence. Wet cannot exceed 80%, room temperature should be between 0°C and 40°C.

 While unpacking make sure if the paint is scratched somewhere, and that all boiler parts are stable and fixed in its place.

3.2 Additional parts and documents

 Following parts and documents are delivered along the boiler:

- A cleaning kit
- Warranty and this manual
- Energy efficiency label
- Boiler regulation (part of the boiler)
- **Fill / Drain tap** valve inside a small bag along with the extension tube
- Special key to open the lower door of the boiler
- Expansion vessel, circulation pump and safety valve built-in

 Following parts are not delivered with the boiler:

- Thermo-manometer and the safety group
- Mixing valve
- Additional boiler room valves and fittings

4 Introductory notes

 The end user must strictly follow the guidelines prescribed in this manual. On the contrary, the warranty will not be recognized.

 Only permitted fuel for this boiler is wood pellet, EN 14961, quality A1 or A2, diameter 6mm or 8mm.

 The heating chamber of the boiler is factory tested at **test pressure of 4 bar**.

 Pay strict attention that boiler valves are always open while boiler in use.

 The boiler has an expansion vessel of **6 litres**. Boiler comes with a circulation pump and safety valve inside (beneath the back cover). Air vent is not included.

 Don't forget to do a mechanical reset of the circulation pump at start of every heating season.

 Clean the boiler on a regular base.

 While the boiler is heating up, damp patches and drips may occur in the chimney area and in the hearth. If the pressure in the installation is constant, this phenomenon represents condensation and not a leak from the boiler. The reason for the condensation is a large temperature difference between the flow circuit and the return circuit, and occurs as a consequence of the following errors:

- If the power of the installed boiler exceeds the size of the installations,
- The mixing valve for the protection of the cold part of the boiler has not been installed.
- The boiler door or the ash pan are not correctly positioned (there is more air than necessary).

 If the boiler leak is reported to the repair team and it is condensation, the team's visit will be invoiced.

 An expert should be entrusted for the planning and construction of the heating system.

 **In the case of an incorrectly planned system or the the incorrect installation of the system, which can again lead to an incorrect operation of the boiler, the complete liability for the material damage and new costs arising are to be covered by the person who was entrusted with the mounting of the central heating system, and not by the boiler manufacturer, sales representative or seller.**

 Initial operation of the boiler is only to be performed by an authorized person (service) and additional fee applies (not in the price of the boiler).

5 Safety remarks

While in use, some parts of the boiler may be hot. Don't touch the boiler without appropriate hand protection against heat.

If some parts of the boiler occur to be damaged it is strictly forbidden to continue using the boiler.

Do not touch electrical cables with wet hands.

Electric connections must be made according to 73/23 CEE i 93/98 CEE and properly dimensioned.

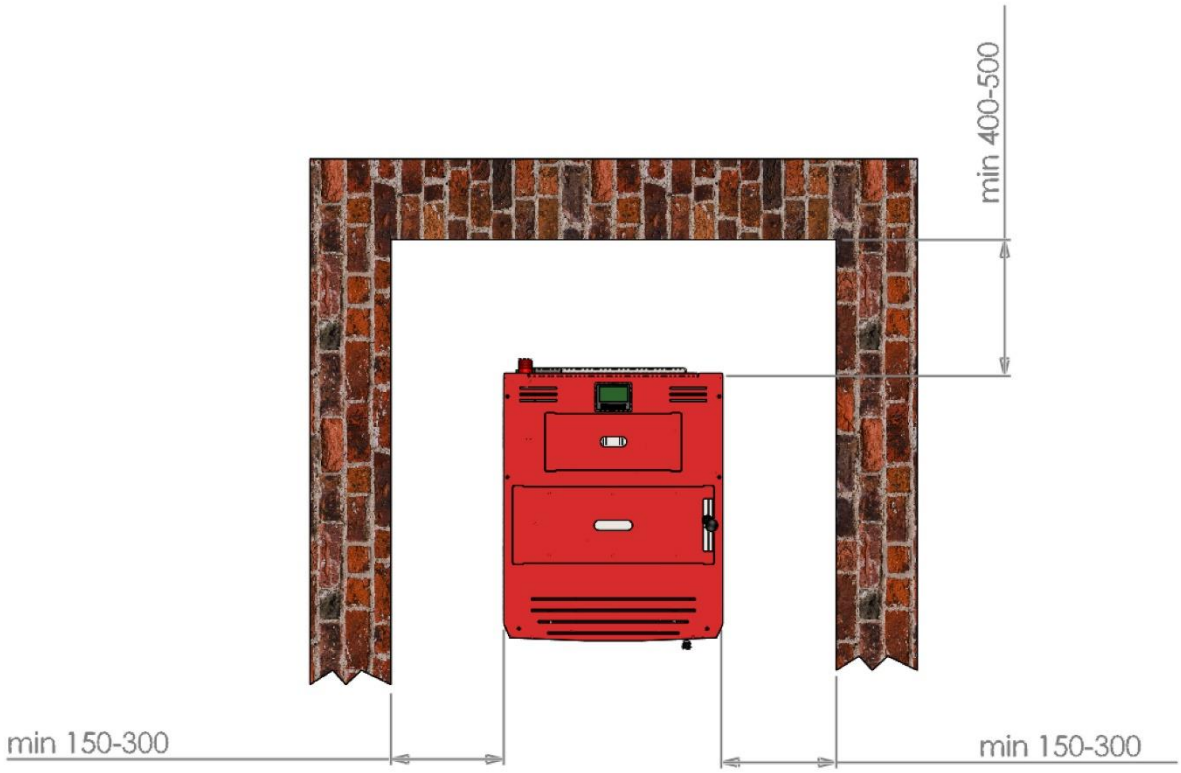
6 Boiler installation

6.1 Boiler room

Room where heater is placed, must possess windows, minimum surface area of window is given by equation:

$$A\ (cm^2) = 60$$

where **P** represents nominal power of the **KW**.



Boiler basement must be stable and made of fireproof material.

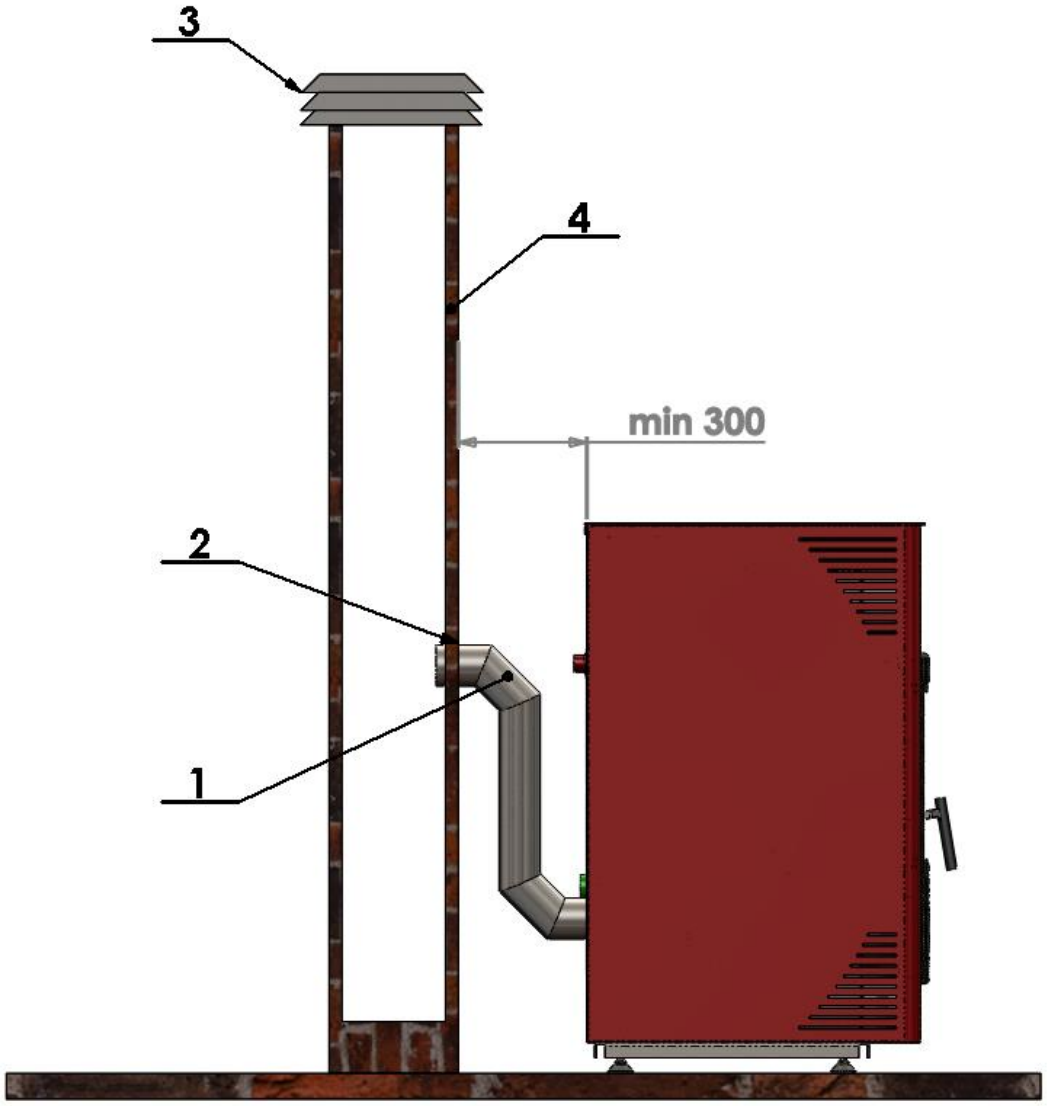
6.2 Connecting to the chimney

Helena Aqua is a space-heater and a boiler too – it means it requires a natural draught and a chimney not just to transport flue gases out of the boiler but also to create negative pressure necessary for boiler function. This heater requires pressure drop of **8-10 Pa**.

Please note that cast-iron boiler door has two small sliding openings. The lower opening has to remain closed all the time, otherwise the draught of the boiler will be disrupted. The upper opening should be used **only occassionaly** in order **to clean the glass window** from smoke. It should be closed the most time.

Chimney is to be connected as depicted below and it is necessary to clean the chimney **1-2 times per year**.

To reduce heat loss and due to ecological and safety factors, it is essential to have a vertical chimney connected according to the picture and, if conditions allow, the chimney must be of quality (made with ceramic segments thick up to 5 cm). Clean the chimney regularly, at least once or twice a year. The maximum number of elbows between the boiler and the chimney is **2.**



1)Flue pipe 2) Gasket 3) Fireproof protection cap 4) Chimney diamater not greater than

200x200mm with max height 5-6 metars.

6.3 Filling the system with water

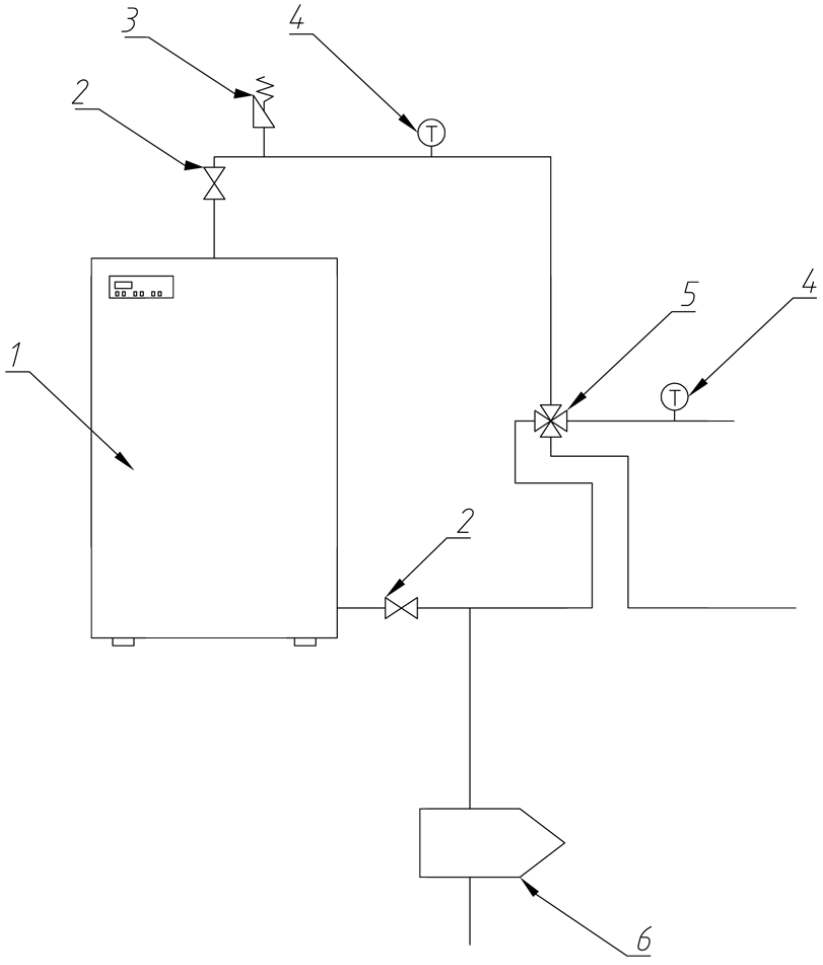
Filling the system with water is to be done using the tap valve connection of the boiler.

When filling the system with water take care that no air remains in the boiler.

The filling process is done when no air is coming out through automatic air vent and pressure gauge is showing the value between **1 bar** and **1,5 bar** (closed systems). Air vent is to be set at the highest point of the (closed) central heating system. If the pressure is below 1,5 bar the filling process must be repeated. After the filling process is done, it is obligatory to close the drain tap valve, close the water supply to the water-filling pipe and detach the water-filling pipe.

6.4 Connecting the boiler with a closed central heating system with circulation pump on the return line

Recommended connection scheme is depicted below:



1) Boiler 2) Boiler valve 3) Automatic air vent 4) Thermo-manometer 5) Mix valve 6) Dirt catcher

The safety valve (with preset **1,5 bar** threshold) is already mounted on the backside of the boiler.

It is essential to have a thermometer and a manometer installed to the system (Position 4 on upper scheme)

It is recommended to install a dirt catcher and also an anticondensation valve on the return line. (3-way mixing valve).

Additional closed expansion vessel (position 7) should be mounted close to the boiler. Vessel must be positioned so that its membrane is in horizontal position. The volume of the expansion vessel should be around **18 lit**.

Please read the circulation pump manual before placing it into operation. Please note air vent is not pre-mounted within the boiler, it should be installed (Position 3) additionally.

6.5 Installation of temperature relief valve with obligatory filling

The temperature relief valve (as shown below or similar) must be present in the system. The valve must be installed by a qualified technician in accordance with the instructions given in the manual from the producer of the valve.

In the event of a rise in the temperature of the water in the boiler for any reason and if the critical value of **95-100 C** is reached, the role of this valve is to open the supply channel of the cold water from the network and directly cool the water in the boiler, thus preventing a potential breakdown.

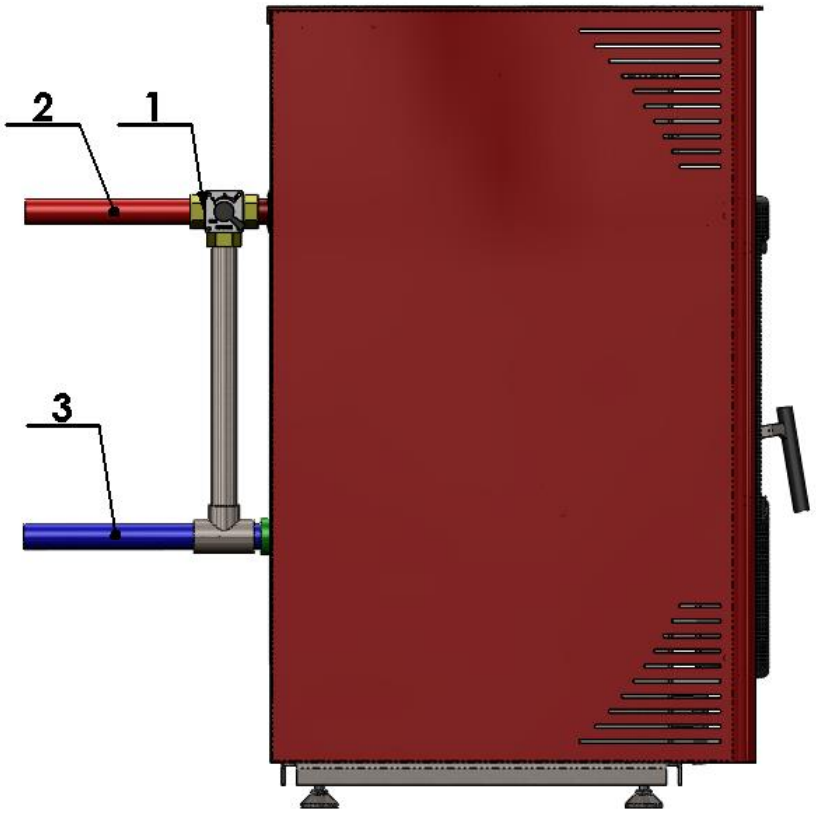
When the set temperature is reached, the cold water valve and the drain open simultaneously until the temperature drops to the marked value, after which the valves are closed simultaneously.

The method of installing the thermal exhaust valve is described in detail in the manufacturer's instructions that are accompanying the product.

7 Boiler return-line protection against condensation

It often happens that water runs under the boiler and creates a small puddle. This phenomenon does not always mean that the boiler is leaking. In most cases, it is a bad installation of the boiler, a bad selection of the power (size) of the boiler, or a bad chimney, which leads to the creation of condensation of the boiler. This is not pure water, but "condensate", which may contain, depending on the fuel used, substances harmful to health. This water can cause boiler corrosion and greatly reduces the life of the boiler.

If the chosen boiler corresponds to the calculated heating surface, the problem of condensation can be avoided with protection of the cold part of the boiler by installing a designated device called the mixing valve:



1. 3-way mixing valve 2. Circulation pump 3. Thermostate

The function of the mixing valve is to immediately transfer a part of hot water to the cold part of the boiler in order to reduce the temperature difference between flow and return line. Indeed, low temperature corrosion occurs when the temperature of the water in the return circuit of the heating is below the point of creation of condensation by the flue gases. If this is the case, then the condensation of water vapor in the flue gases occurs, which creates condensates, i.e. the water flowing from the boiler.

Installation of the mixing valve is obligatory.

8 Boiler cleaning and maintenance

The boiler has an automatic burner ash removal system, i.e. the bottom of the burner is rotating, so that ashes are falling down into designated area. Regular cleaning cycle of this product is extended, yet still necessary!

Regular maintenance and cleaning of pellet boilers is necessary to ensure product functionality and long-life operation. Boiler cleaning consists of following operations:

1. Emptying ash-trail of the boiler
2. Removing ash from the bottom part of the boiler
3. Cleaning of burner pot and the tubulators
4. Cleaning of the holder of burner pot

Occasional (seasonal) cleaning consists of regular weekly cleaning plus detailed cleaning of the

heating chamber from above on the end of season. It is recommended to provide a vacuum ash-cleaner for faster and detailed cleaning. If not, a cleaning kit delivered with the boiler can do the job too.

 How often is the boiler cleaned? This depends exclusively on the quality of the pellets. A weekly cleaning of the boiler is essential and the detailed cleaning at the end of the heating season. The automatic ash removal system makes the boiler more resistant to poor quality pellets and guarantees reduced cleaning of the boiler.

 If poor quality pellets are used which contain impurities of inorganic origin (earth, sand), these will accumulate over time in the form of "silicone" layers. In this case, the boiler will not work properly.

 Lack of cleaning of the boiler leads to rapid degradation, i.e. corrosion of certain parts of the boiler, which leads to poor combustion and heat loss.

 This boiler is intended for use with clean wood pellets without additives. The combustion will be of better quality and the life of the burner will be longer.

 Before accessing cleaning, the boiler must be switched off and all parts of the boiler must be completely cold.

 Use of gloves is obligatory for all operations described.

8.1 **Weekly boiler cleaning**

Open the door, release the removable, ring part of the burner.

CAUTION : Only when boiler is cold.

Clean the burner from ashes.

Clean the ashes in the area around the burner.

The heating chamber must be free of ashes when finished.

Put back the burner ring.

Open the lowest part of the boiler (release the screws).

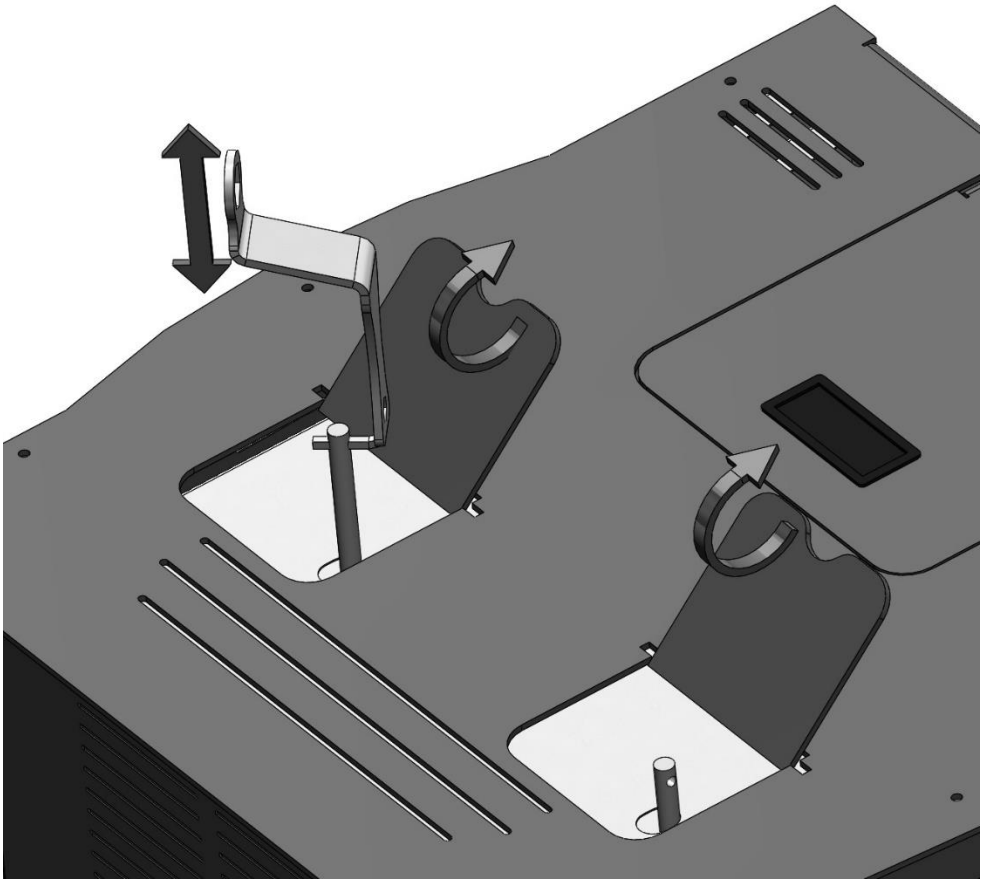
Clean the area from ashes

If you are not in possession of vacuum ash cleaner all operations can be done with manual kit submitted with the boiler.

Weekly cleaning of the tubulators:

CAUTION: Perform this operation only when the heater is completely cold.

Using boiler key, boiler tubulators are to be moved upside-down in order to force the ash to fall down.



8.2 **Seasonal cleaning of the boiler**

Seasonal cleaning consists of two parts. First part is weekly cleaning described in the chapters above, that has to be done also at the end of the heating season. On top of that, on the end of every season, the upper part of the boiler chamber must be open and cleaned. This operation can be made by service technician (additional fee applies).

Before starting the seasonal cleaning make sure you have following items ready: protection gloves, vacuum ash-cleaner (or manual kit), boiler key and mechanical key size 13.

There is a cover with insulation to be removed.

Use the boiler key to release the cover. Put the cover on side.

Make sure the insulation is not damaged when manipulating with cover.

Now take the mechanical key size 13 and open all the screws.

Now release the chamber top.

Start cleaning all the parts that are accessible.
Paint brush can also be a useful tool.

Otherwise the ash-cleaner will do the job.

When we have finished the cleaning we put back the chamber top.

…and its cover afterwards.

THANK YOU FOR READING THIS DOCUMENT CAREFULLY – IF YOU HAVE ADDITIONAL QUESTIONS FEEL FREE TO CONTACT US OR YOUR LOCAL RESELLER.

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