Highland heat

Agro Uni

Agricultural waste boiler

User manual

Maintenance and installation

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Agro Uni

Table of content

Agro Uni

Safety provisions

During the use of the boiler, its individual parts: chimney, door, individual points of the body - can heat up and cause burns if touched.

Do not allow children to touch or use the boiler without adult supervision.

The boiler can be operated by a capable adult who has carefully familiarized himself with this instruction.

Only a qualified specialist can install the boiler and connect it to the heating and electrical systems.

If you suspect that the boiler has malfunctioned, please contact the organization that installed the boiler or the manufacturer's representative. Do not under any circumstances use a malfunctioning boiler.

Improperly connected and used boiler can cause injury or death.

Agro Uni

1. Introduction

1.1 General information

The **Agro Uni** boiler models are characterized by an exceptionally large heat exchanger, which allows to achieve an efficiency of more than 90 percent, and very good tray pellet burners with a wide range of control options.

Before connecting the boiler to the heating system carefully read this manual to ensure that all boiler components and equipment are working properly.

Agro Uni boilers are designed for heating private residential houses, commercial and auxiliary premises. The boilers belong to the so-called low-temperature boilers category, i.e. the average temperature of the heat carrier cannot exceed 90 °C, and the maximum operating pressure - 1.5 bar.

The manufacturer has the right to make minor changes that do not significantly affect the quality of the combustion process and the operation of the boiler. We do not recommend equipping the boiler with a stainless steel chimney.

1.2 Standards and regulations

The boiler must be installed and operated in compliance with the legal requirements of the country to which it is supplied. It must be installed in accordance with the requirements of the maintenance and installation instructions.

Otherwise, the manufacturer assumes no responsibility and does not guarantee repair for any defects.

Agro Uni

2. Techniniai katilo parametrai

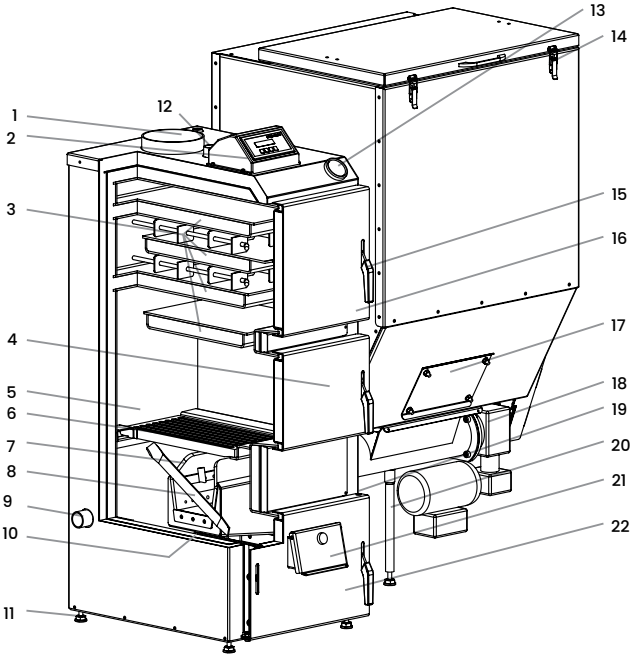
Models and power output		15 kW	20 kW	30 kW	40 kW
Heated area	Max m^2	150	200	300	400
Combustion chamber depth	mm	450	450	500	600
Combustion chamber load	l/dm^3	35	40	65	104
“Zenono” burner	kW	3-15	3-20	4-30	8-50
Heat exchanger area	m^2	1,9	2,5	3,3	4,2
Combustion chamber opening size	cm	29x23	34x23	44x23	49x23
Number of horizontal heat exchangers	pcs	3	4	4	4
Volume of water in the boiler	l	48	62	69	100
Weight	kg	180	230	270	310
Chimney inner-outer diameter	mm	150/160	150/160	150/160	185/195

Stirring fuel chamber capacity	400/600 l/dm^3
Lowest operating temperature	60° C
Highest operating temperature	90° C
Heating efficiency	90%
Hydraulic connections size	G $1^{1/4}$ inch
Highest operating pressure	1,5 bar
Required draft in the chimney	15-20 Pa

Agro Uni

3. Construction

3.1 Boiler components



1. Chimney
2. Controller
3. Heat exchanger
4. Cleaning door
5. Combustion chamber
6. Cast iron grates
7. Tray burner
8. Mixer
9. Return branch pipe
10. Ash box
11. Adjustable legs
12. Supply branch pipe
13. Thermometer
14. Fastening of the fuel chamber cover
15. Door handle
16. Fuel loading door
17. Fuel chamber maintenance cover
18. Reducer
19. Blower
20. Adjustable fuel chamber leg
21. Adjustable air valve
22. Bottom door

3. Construction

3.2 Boiler

The boiler heat exchanger consists of three main zones. Four horizontal heat exchangers (three in the 15 kW boiler) are placed in the area of the upper door (3). The upper door is used when it is necessary to clean the surface of the heat exchanger. There is a solid fuel combustion chamber in the area of the middle door (5). This chamber is designed to use cheaper solid fuel which is loaded manually. The middle and lower chambers are separated by cast iron grates (7). It is recommended to remove the grates during continuous firing in automatic mode. The tray burner (8) is installed on the side of the boiler and is connected to the fuel chamber. A blower (19) is installed on the side of the boiler, near the fuel supply pipe. The burner has a built-in mixer that helps burn difficult burning fuel (9). A pull-out ash box (11) is placed under the burner for ash removal. An air valve is installed in the front of the lower door. The boiler controller (2) is installed in the front part of the boiler. The internal heat exchanger is made of bent and welded heat-resistant steel sheets, and the finish is made of powder-coated sheets. Underneath the boiler is an insulating layer of glass wool, which protects against heat loss through the boiler's outer walls. Double doors are sealed with heat-insulating material and painted with heat-resistant paint. Gases generated during combustion are removed through the chimney pipe (1) installed in the upper part of the boiler.

3. Construction

3.3 Pellet chamber

The pellet chamber is designed to store fuel and supply it to the boiler in automatic mode. The delivery system can be on the left or the right side, depending on the order. Fuel is loaded into the chamber by opening the lid. Fuel falls down to the bottom, where it is fed to the burner through a feed pipe with the help of a screw-type feeder. After opening the tank maintenance cover (17), we can access the cleaning opening. It is designed to periodically clean the accumulated pellet dust, which reduces the performance of the pellet feeder.

3.4 Burner

Agro Uni boilers use „Zenono“ tray burner that can burn lower-quality, difficult burning pellets and other fuels: wood pellets, grass pellets, grains, oats, beans. A fuel mixer is installed together with the burner, designed to facilitate the burning of extremely difficult burning fuel. This is a high quality, long lasting new generation burner, designed to burn pellets and other fuels. This is the only (and without any competition) burner designed and manufactured in Lithuania. Reliable construction and quality components will allow you to use this burner for a long time.

3.5 Controller

An **Inter Electronics** controller is installed in the boiler. The controller is a modern electronic device designed to control the operation of the pellet boiler using data from various sensors. The device is compact and easy to install. It can control the central heating and hot water circuits and the burner.

3. Construction

The temperature of the heating circuits can be determined by the data received from the main temperature sensor or the room thermostat, which turns off the boiler pump.

When connecting the thermostat, it is necessary to ensure the minimum heat demand for boiler operation in standby mode.

The compatibility with standard room thermostats allows you to maintain a comfortable temperature in all premises (rooms). Controlling the boiler is easy and simple. The controller can be used in households and small industrial facilities.

3.6 Boiler set

1. Boiler
2. Fuel chamber
3. Fuel supply mechanism
4. Burner
5. Controller
6. Stainless steel burner cleaning mechanism (2 pcs.)
7. Blower
8. Set of grates
9. Ashtray
10. Boiler cleaning tools
11. Thermometer
12. User manual
13. Turbulators (ordered additionally)

Agro Uni boilers are sold only complete with „Zenono“ burner and **Inter Electronics** controller.

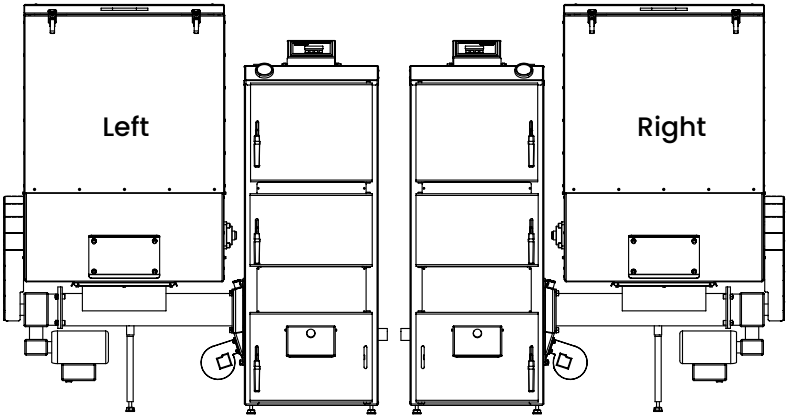
4. Boiler installation

Agro Uni boilers are equipped with a pellet chamber of 400 or 600 liters.

We do not recommend equipping the boiler with a stainless steel chimney.

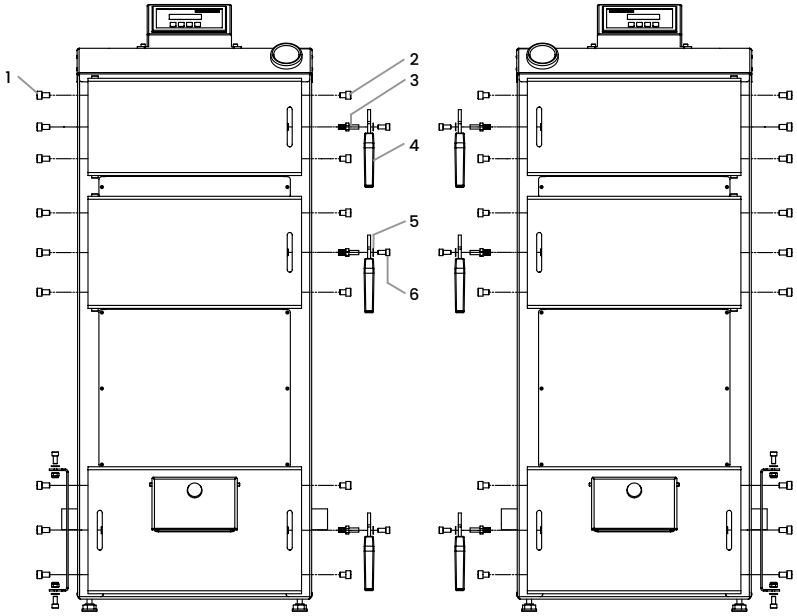
4.1 Location and position of boiler and pellet chambers

The boiler and pellet chamber must be placed on a hard, smooth and non-flammable dry surface. It should be convenient to access the bed burner, blower, controller, pellet chamber, and fuel supply system, ash collector and other mechanisms. The pellet chamber can be on the left or right side of the boiler depending on the order. The door opening direction can be changed.



4. Boiler installation

4.2 Changing the door direction

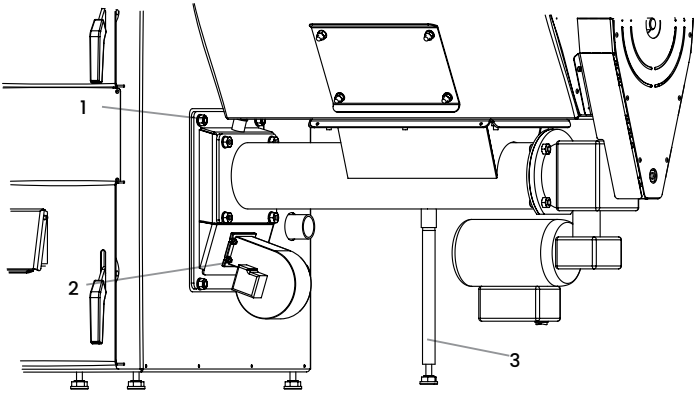


1. Screw DIN 912 M10x16
2. Screw DIN 912 M10x12
3. Eccentric M10
4. Door handle
5. Spring washer
6. Screw DIN 912 M8x160

The direction of the upper and middle doors is changed by turning the door together with the hinge (hinges) away from the boiler body and screwing it on the opposite side of the boiler. The door handle is unscrewed, turned over and screwed back. The direction of the lower door is changed by turning the door away from the hinge. The hinge is unscrewed from the boiler body and screwed on the opposite side of the boiler. The door is screwed to the hinge, and the door handle is unscrewed from the door and screwed back to the opposite side of the door.

4. Boiler installation

4.3 Boiler assembly

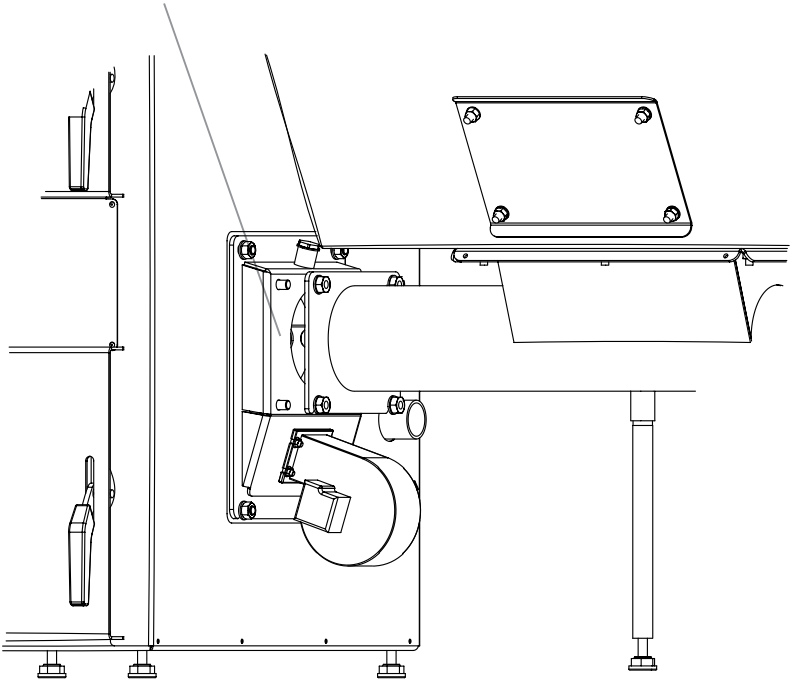


The fuel supply system and chamber are installed in three stages:

1. The assembled fuel tank is fixed to the boiler in the appropriate place with (1) four M10 screws.
2. The correct height of the fuel tank and feed pipe is determined by the adjustable leg (3).
3. The blower is fixed under the fuel supply pipe, in the designated place, by fixing with four M6 screws (2).

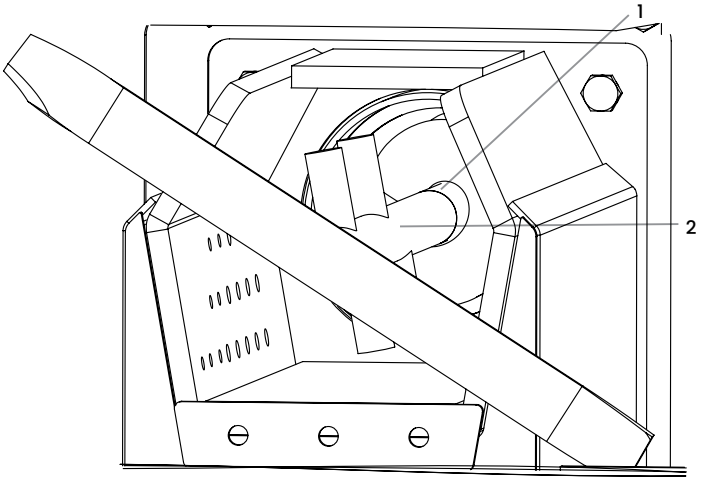
4. Boiler installation

It is necessary to lubricate the connection with heat-resistant silicone before screwing the fuel supply screws to the burner!



4. Boiler installation

4.3.1 Installation of the burner cleaning mechanism



Installation of the burner cleaning mechanism (hedgehog):

The burner cleaning mechanism (2) is installed in the burner by screwing it to the fuel supply nozzle (1).

4. Boiler installation

4.4 Connecting the boiler to the chimney

The chimney must be installed according to the requirements of the country where it is installed. The recommended chimney draft is 15-20 Pa. If there is too much draft in the chimney, a draft regulator should be installed.
The boiler branch pipe must be connected to the flue itself with a rigid steel connection of suitable cross-section and shape. The connection of the boiler to the chimney must be properly insulated to prevent burns.

4.5 Connecting the boiler to the central heating system

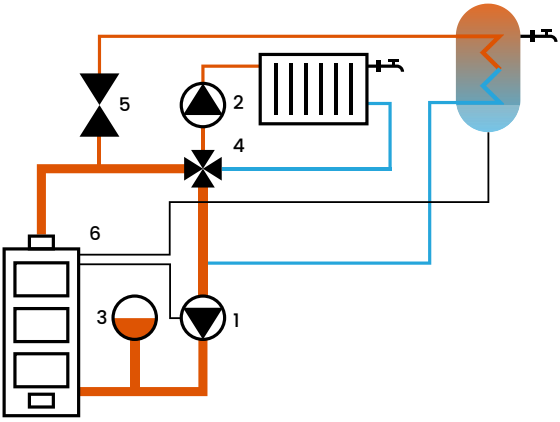
Delegate the work of connecting the boiler to properly qualified specialists.

In order to extend the service life of the boiler and to ensure proper use, it is necessary to follow an installation scheme that ensures maintenance of the working temperature of the boiler not below 60°C. With the help of a specialist, make sure that the condition of the boiler, automation, plumbing connections, flue tightness and components are working properly. In a closed heating system, there must be a thermal expansion compensation vessel of suitable capacity (at least 10% of the total liquid volume in the system). Safety valves or valves that restrict flow in this system are prohibited.

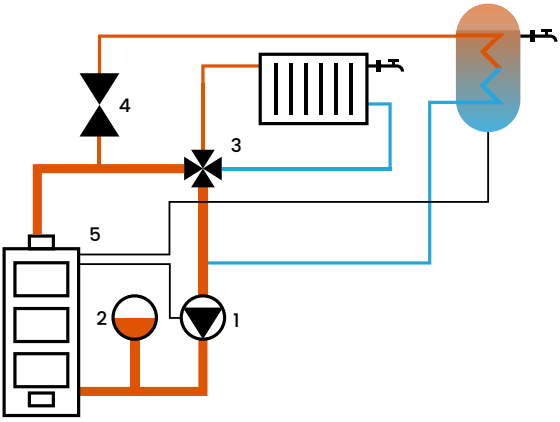
Recommended wiring diagrams are provided in subsection 4.6

4. Boiler installation

4.6. Recommended connection diagrams



1. Small perimeter pump
2. Big perimeter pump
3. Expansion vessel
4. Four-way valve
5. Reverse valve
6. Boiler



1. Small perimeterpump
2. Expansion vessel
3. four-way valve
4. Reverse valve
5. Boiler

4. Boiler installation

4.7 Installing the controller

Installation, commissioning and tuning of the controller can only be performed by certified specialists. The controller is installed in the upper part of the boiler. The procedure for connecting the controller is included with the controller instruction.

The temperature sensor is installed in the sleeve at the top of the boiler. When installing the temperature sensor in the boiler, it is necessary to lock the sensor in the sleeve to prevent accidental removal. If the temperature sensor falls out of the sleeve, the boiler may boil.

4.8 Starting the boiler, burner and controller

When starting up the boiler for the first time, a certified specialist must train the user on how to use the heating system. Burner start-up, warranty and post-warranty services are carried out by "Zenono" burner manufacturer: +370 618 63071.

The manufacturer is not responsible for the quality of boiler operation and malfunctions if the user starts the burner and controller himself. We recommend delegating the burner start-up work to a certified specialist.

5. Using the boiler

5.1 General information and sefety

Agro Uni is a universal boiler, adapted to use extremely difficult burning pellets or grain products, as well as cheaper solid fuel using manual loading. Pellets are ignited with a "Zenono" burner, and a mixer is used to facilitate the burning of extremely difficult burning fuel. The fuel is ignited manually. The combustion process of both pellets and solid fuel is controlled by the controller.

Use the boiler safely and follow the basic safety and boiler operation rules.

• Check the operation of the safety valve (no more than 1.5 bar) and open the shut-off valves between the heating boiler and the heating system.
•Check the water pressure in the system.
• The heating system must be filled with water and bled.
• When starting solid fuel, never use flammable liquids - gasoline, paint thinners etc.
• Do not burn plastics, rubber and other air-polluting waste.
• The smoke extraction system must be reliably connected and sealed.
•Unmaintained chimney, insufficient draft can cause monoxide poisoning.
•Maintain the boiler only after it has cooled down.

If you suspect that the boiler or the heating system is not working properly, stop using it and contact a specialist.

5. Using the boiler

5.2 Boiler fuel

Primary fuel: wood pellets, economic fuel (grains, beans, oats etc.) Secondary fuel: firewood, sawdust briquettes, peat briquettes, coal.

5.3 Using the boiler in automatic mode

A properly connected boiler can operate in automatic mode depending on the heat demand. The combustion process is controlled by a controller based on data received from sensors. The burning intensity of the burner is automatically regulated, the temperature of the boiler is changed according to the preset parameters. To set the automatic mode when burning pellets, the select: Menu–>11. "Advanced parameters"–>11.9 "Feeder Type" and select the "Screw" parameter. The burner is filled with pellets by selecting: Menu->10 „Manual Mode" and turning on the feeder. Other receivers can also be tested in this mode. After filling the burner with pellets, the fuel is ignited manually and the automatic mode is activated (return to the main screen of the controller and press the ESC button).
For continuous burning of the pellets, it is recommended to remove cast iron grates from the combustion chamber of the boiler.
More information about the controller can be found in the controller manual.

5.4 Using the boiler in manual mode (solid fuel)

The solid fuel burning process and the operation of the entire boiler room are controlled by the same controller.
To start burning solid fuel, select: Menu–>11. "Advanced parameters"–>11.9

5. Using the boiler

Feeder type and optional parameter “Output”. The controller will start supplying air for burning solid fuel, but will continue to fully control all boiler control processes.

In the case of low heat demand or too high draft of the chimney, due to the natural air inflow through the fan, intense combustion may occur, so the boiler may overheat.

Before starting to burn solid fuel, make sure that the cast iron grates are in the correct position (“∇∇∇∇∇”). When stacked in reverse, wood fractions and ash fall, clogging the gaps. In this case, the boiler loses its traction and power, the grates fold.

5.5 Maintenance

Maintenance and cleaning of the boiler is carried out periodically. Cleaning frequency ie determined by the need. With a well-balanced system, the boiler is cleaned once a month. The heat exchanger is cleaned by opening the upper door.
Ash cleaning from the ashtray is carried out as needed, depending on the type of fuel used and ash content. A full ashtray can interfere with the correct operation of the burner.

Maintenance of the pellet feeder.
Opening the maintenance cover of the pellet chamber provides access to the cleaning opening. It is designed to periodically clean the accumulated pellet dust, which reduces the performance of the pellet feeder.

Burner maintenance.
It is recommended to clean the bed burner every 2 months.

6. Boiler warranty card

Models _____

Designated power uotput _____

Serial No. _____

Production year _____

Boiler starp-up date _____

Comments

_____

_____

_____

_____

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7. Burner warranty card

Burner type/model _____

Serial No. _____

Purchase date _____

Comments

_____

_____

_____

_____

Signature, stamp

8. Warranty conditions

When selling the boiler, the seller must familiarize the buyer with the terms of the warranty.

1. The manufacturer provides:
• 5-year warranty for the tightness of the boiler heat exchanger.
• 3-year warranty for the burner.
• 2-year warranty for electrical and electronic devices.
• 2-year warranty for the included parts.
• the stainless steel cleaning mechanism is not covered by the warranty.
2. The boiler installation scheme must ensure the return water temperature is not less than 60˚ C.
3. Boiler installation must be performed only by a qualified specialist.
4. During the warranty period, the manufacturer undertakes to carry out free of charge elimination of malfunctions, if they occurred due to the fault of the manufacturer.
5. The warranty does not apply to:
• Failure to submit purchase documents and a stamped warranty sheet.
• Violation of installation, operating instructions or warranty conditions requirements.
• In case of mechanical damage to the boiler.
• After determining that the boiler has been repaired by an outsider.
• In case of natural disasters.
6. Defects detected during the warranty period will be eliminated within 21 working days from the date of the complaint.
7. Costs related to service calls and repairs, if it is determined that the warranty conditions have been violated, are covered by the buyer.

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9. Efficiency and emissions

Ecodesign 2015/1189

Agro Uni 20								
Automatic ignition - the boiler should be used with a hot water tank of at least x* liters								
Condensing boiler [no]			Solid fuel cogeneration boiler [no]		Combined boiler [no]			
Fuel	Most suitable fuel	Other suitable fuel	η_S [x%]:	Seasonal space heating emissions				
				SP	GOC	CM	NO_X	
				[x]mg/m³				
Wood pellets	Yes	No	85±3	31±10	10±5	385±10%	174±5%	
Characteristics when burning only the most suitable fuel								
Useful heat release					Heat utility			
Parameter	Symbol	Value	Unit		Parametras	Symbol	Value	Unit
At nominal heat output	P_n	17,7	kW		At nominal heat output	η_n	88,1	%
At [30%/50%] rated heat uotput, if applicable	P_p	5,1	kW		At [30%/50%] rated heat output, if applicable	η_p	85,0	%
List of equivalent models				**Agro Uni 15, Agro Uni 30, Agro Uni 40**				

SP – solid particles, GOC – Gaseous organic compounds, CM – carbon monoxide
NOx - nitrogen oxides, η_s - Seasonal energy consumption efficiency for space heating (Efficiency factor - 3%)
η_n - Seasonal energy consumption efficiency for space heating at maximum power
η_p - Seasonal energy consumption efficiency for space heating at 30% capacity
X - Chamber volume = 45 × Pr × (1 – 2.7/Pr) or 300 liters, whichever is greater, Pr is expressed in kilowatts (kW)
Y - Chamber volume = 20 × Pr, Pr is expressed in kilowatts (kW)

9. Efficiency and emissions

Additional electricity consumption

At nominal heat output	el_{max}	0,057	kW
At [30%/50%] nominal heat transfer, if applicable	el_{min}	0,030	kW
Secondary abatement equipment installed, if applicable		Non applicable	kW
When operating in standby mode	P_{SB}	0,025	kW

10. Disposal of the boiler

The boiler must be disposed of in accordance with the requirements of the country where it is disposed of.

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Notes

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Notes