MCE
PRODUCENT KOTŁÓW

installation and operating manual central heating boiler

type AGRO V2
AGRO V2S

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1. INTRODUCTION

The assembly and operating manual is intended to familiarize the user with the structure, operation, installation and operation rules of the heating boiler type AGRO V2 and AGRO V2S fired with solid fuel -non-wood biomass in the form of briquettes made of straw, hay, miscanthus.
Before starting the installation and operation of the boiler, each user should read the manual carefully. It contains recommendations for the correct handling and operation of the boiler. Failure by the person installing the boiler and the user to follow the recommendations and instructions contained in this manual may lead to the loss of warranty and pose a threat to the health and life of people staying in the facility where the boiler operates.

2. GENERAL INFORMATION

Before installing the boiler, carefully read the documentation and check the completeness of the boiler accessories and the elements and materials used for its assembly, both to the central heating system and to the chimney.

2.1 Commercial versions of the AGRO V2 and AGRO V2S boiler series

V2 boilers are produced in the following commercial varieties:

- with the possibility of installing an air draft regulator for automatic control of the water temperature in the boiler - commercial designation AGRO V2-10, AGRO V2-15; AGRO V2-20; AGRO V2-25; AGRO V2-30,
- with a microprocessor controller controlling the operation of the blow-in fan and central heating and domestic hot water pumps - commercial designation **AGROV2S-10, AGRO V2S-15; AGRO V2S-20; AGRO V2S-25; AGRO V2S-30,**

2.2 Application

AGRO V2 and AGRO V2S boilers are intended for use in gravity or pump central heating installations in single-family houses, service and commercial outlets, workshops, rural households, etc., with a supply water temperature not exceeding 95°C. The boiler belongs to the group of low-temperature water boilers and is not subject to registration at the regional Office of Technical Inspection.

AGRO V2 and AGRO V2S boilers may only be used in open system installations secured in accordance with PN-91 / B-02413 - Heating and heat engineering. Protection of open system water heating installations. Requirements.

An example of a security scheme for an open water system heating system is shown schematically in Figs. 2 and 3.

2.3 Fuel

- coal, wood (humidity <15%)

CAUTION:

It should be remembered that the use of unsuitable solid fuels while maintaining low exhaust gas temperatures and the return water temperature below 500C leads to accelerated wear of the boiler and reduces its efficiency. It is caused by the condensation of combustion products - with nitrogen and sulfur, which, when combined with water, create an aggressive environment causing corrosion of boiler components. In the absence of a chimney insert, the low temperature of flue gas and water on the return from the heating system causes the condensate from the chimney to penetrate into the building interior.

2.4 Selection of a boiler for the heating system

The basis for the selection of a boiler for the central heating installation is the heat balance of heated rooms prepared in accordance with the PN-B-03406: 1994 standard - "Heating. Calculation of heat demand for rooms with a cubature of up to 600 m3 ”by an authorized building designer.

In the case of the estimated (approximate) method, the largest possible number of potential factors affecting heat losses and heat gains in the facility should be taken into account, so that the selected boiler power corresponds to the actual demand for thermal energy.

It is recommended that the nominal power of the boiler is equal to the calculated heat demand for the heated building. Then, even in extreme weather conditions (outside temperature approx. -20°C) it is possible to provide thermal comfort in heated rooms.

The boiler should be selected depending on the heat demand of the building while ensuring thermal comfort. The selection of the boiler power depends on many factors, including wall thickness, building insulation, tightness of windows and doors, type of glass used, as well as the climatic zone in which the building is located. Selecting a boiler with too much power will result in higher fuel consumption and higher operating costs, while a boiler with too low power will not meet the expectations and will not provide thermal comfort.

The estimated selection of the boiler heating power can be based on the formula:

$$Q_{kota} = F_{OGRZ} * \ q$$

Q_{kota} - boiler heating power [kW]

F_{OGRZ}-heated area [m2]

q-unit heat demand [kW / m2]

3. TECHNICAL CHARACTERISTICS OF THE AGRO V2S BOILERS

3.1 Description of the construction of boilers

The AGRO V2S series boilers (Fig. 1) are a welded structure. The internal walls of the boiler water body are made of 6 mm thick P265GH steel sheets. The walls are reinforced with rod and tubular anchors.

The furnace chamber is built in the shape of a cuboid. The bottom of the furnace chamber is closed with a water grate made of thick-walled "boiler" pipes. Above the furnace chamber there is a convection section of the boiler with four horizontal shelves, forming the flue gas ducts, which discharge the flue gas to the boiler flue with the flue gas throttle located on the rear wall of the boiler.

The fuel to the boiler is manually fed through the charging door. The grate and the furnace chamber are operated through the furnace door.For periodic cleaning and shaking of the grate, a grate reel is operated by a lever on the side wall of the boiler.

The air for fuel combustion is forced by a radial fan, a rectangular air duct into the ash pan, from where it is distributed to nozzles located in the side walls of the combustion chamber (secondary air) and under the grate into the combustion zone (primary air).

Alternatively, the operation of the AGRO V2 boiler in manual mode with air suction by the chimney draft can be monitored by the draft regulator. In this version, a rectangular air damper is mounted on the ash-pan door. The throttle cover is equipped with a handle for mounting the draft regulator rod mounted in the stub on the front wall of the boiler. The air is sucked in by the chimney draft (through the throttle in the furnace door), to the ash pan, from where it is distributed to the secondary air nozzles and under the grate (primary air).

The boiler is equipped with connectors:

- supply and return R1½ "of heating water,
- drain connection G½ ",
- connector for mounting the G½ ”thermometer,
- sensor wells of the temperature controller and the safety temperature limiter.

- in the AGRO V2 version, a G¾ draft regulator connector,

On the front wall of the boiler, there are ash pan, furnace and charging doors as well as cleaning doors, enabling cleaning of the convection surfaces of the boiler.

The water body is covered with a heat-insulating material placed in a steel sheet mantle.

The operation of the AGRO V2S boiler in the automatic mode with air supply from the fan is supervised by an electronic regulator. In emergency states (overheating of water in the boiler), the controller automatically stops the boiler operation. Restarting is carried out in automatic mode (depending on the type of controller used. Not every manufacturer offers the possibility).

The technical and operational parameters of the AGRO V2 and AGRO V2S series boilers are presented in Table 1.

3.2 Safety and regulating fittings

Boiler temperature controller- ensures economical and automatic operation of the entire central heating and domestic hot water system. Depending on the fuel used, the regulator enables the fan power to be set (providing the right amount of air to the furnace). The regulator can operate in two modes: WINTER and SUMMER. In the winter mode, operation is carried out with the central heating circuit and the domestic hot water circuit, and in the summer mode, only with the domestic hot water circuit.

The DHW TEMPERATURE parameter sets the set DHW tank temperature. After the set temperature is reached, the DHW tank loading pump will be turned off.

The CH PUMP ON TEMPERATURE parameter determines at which temperature of water in the boiler the circulation pump will be activated. The switch-off temperature of this pump is 20C lower than the switch-on threshold (according to the controller manual).

Safety thermostat- protects the heating system against overheating. The thermostat temperature is factory set to 950C, i.e. higher than the maximum temperature that can be set on the boiler thermostat. After the airflow is turned off by the safety thermostat (an alarm is displayed on the regulator), it must be unblocked manually. The circulation pump continues to run after the safety thermostat has been triggered. If the boiler is switched off repeatedly by the safety thermostat, the boiler must be turned off and the cause of repeated overheating of the boiler should be found.

Draft regulator- In an alternative version, it regulates the inflow of air necessary for the combustion process.
By setting the selected temperature on the knob, the regulator will close the air supply flap after the boiler reaches the temperature set on the regulator. After the temperature in the boiler drops, the air flap in the ash pan door opens, increasing the air supply.

Circulation pump- works after the boiler reaches the set temperature (450C as standard) until the temperature drops by 40C below the pump activation temperature (according to the controller manual).

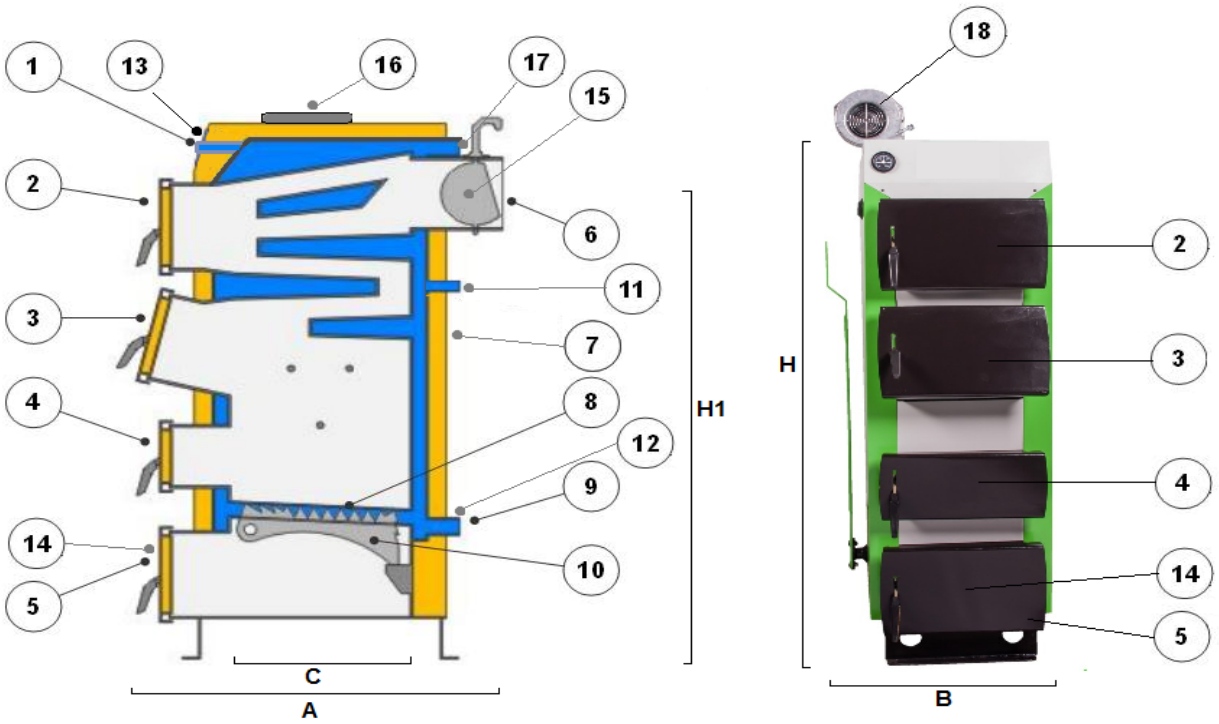
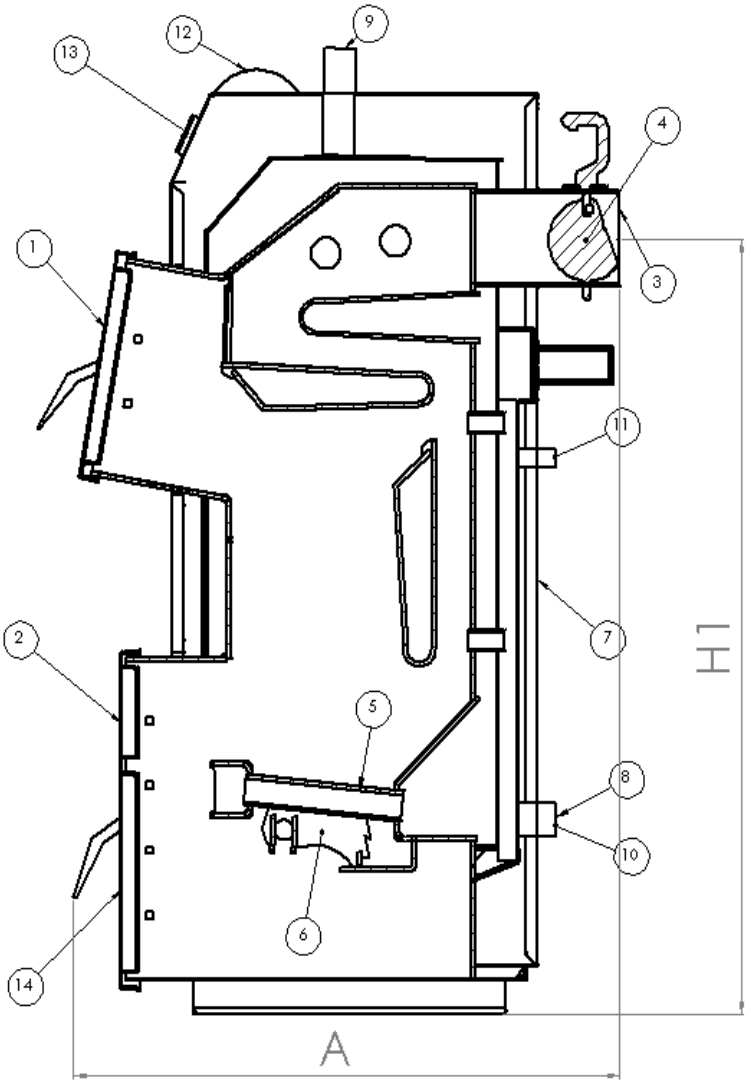


Fig. 1. Cross-section of the AGRO V2S boiler 15 kw 20kw 25kw 30kw

1. thrust regulator connector ¾ "
2. channel cleaning door
3. charging door
4. hearth door
5. ash-pan door
6. flue, exhaust outlet to the chimney
7. steel body with thermal insulation
8. water grate
9. return connection 1 ½ "
10. steel toothed scraper with a lever
11. safety valve connector ¾ "
12. drain valve connection ½ "
13. dial thermometer
14. air flap
15. exhaust throttle
16. microprocessor controller
17. supply connection 1 ½ "
18. fan

Fig. 2. Cross-section of the AGRO V2S 10 kw boiler



1. sewer cleaning door 2. charging door 3. flue, exhaust outlet to the chimney

4. exhaust gas throttle 5. water grate 6. toothed steel scraper with a lever 7. steel body with thermal insulation 8. return connection 1 ½ "9. supply connection 1 ½" 10. drain valve spout ½ "11. safety valve connection ¾ "12. Microprocessor controller. 13. Dial thermometer. 14. air damper

3.3 Technical and operational data of boilers

SPECIFICATION		Jm	BOILER MARKING				
			AGRO V2	AGRO V2	AGRO V2	AGRO V2	AGRO V2
Rated heat output of the boiler		kW	10	15	20	25	30
Boiler thermal power range		kW	4 ÷ 12	8 ÷ 15	15 ÷ 20	20 ÷ 25	25 ÷ 30
Boiler heating surface		m2	1.36	1.65	2.15	2.65	3.2
The area of heated rooms		M2	50 - 120	70 - 150	140 - 200	180 - 250	240 - 300
Thermal efficiency		%	79-84				
Boiler class according to PN-EN 303-5: 2005		-	1				
Fuel			Non-wood biomass in the form of briquettes made of straw, hay, miscanthus				
Maximum allowable working pressure		MPa	0.15				
The required exhaust draft		Bye	twenty	22	23	26	28
Flue gas temperature at rated power		^{0}C.	250				
Flue gas temperature at minimum power		^{0}C.	105				
Boiler operating temperature range		^{0}C.	55 - 90				
Maximum water temperature		^{0}C.	90				
Minimum return temperature		^{0}C.	55				
The minimum height of the chimney		m	The height and cross-section of the chimney should be calculated based on applicable Polish standards. (see point 4.4 of further manual)				
The minimum cross-section in the light of the flue pipe		mm2					
Flue dimensions		mm	127	160	160	180	180
Supply voltage (*)		V	230V / 50 Hz				
Electrical power(*)		In	80				
Supply and return diameter			G 1 ½ "				
Boiler weight without water		kg	200	250	300	350	400
Water capacity		l	38	45	56	74	83
One-time charge weight		kg	18	22	thirty	45	57
Height*	H.	mm	1275	1260	1330	1330	1330
Height from the base to the axis of the flue	H1	mm	1015	1015	1095	1095	1095
Length	AND	mm	780	770	815	865	920
Width	B	mm	460	500	500	550	600
The depth of the combustion chamber	C.	mm	240	300	340	390	440

* DIMENSION WITHOUT FAN. WHEN MOUNTING THE MPLUSM WPA 120K FAN, ADD 180 mm TO THE DIMENSION
(*)- applies only to the commercial version of the AGRO V2S boiler

TABLE 1. Basic technical and operational data of the AGRO V2 and AGRO V2S series boilers

4. BOILER INSTALLATION MANUAL

The boiler is delivered assembled, with additional accessories attached, which must be connected to the installation when installing the boiler. Before starting the installation of the boiler, check that the set is complete and undamaged. The data on the boiler's rating plate must agree with the data in the boiler's documentation.

CAUTION:

All work related to setting the boiler, boiler room equipment, connecting the boiler to the installation and possible repairs should be entrusted to an installer with appropriate knowledge, qualifications and experience. Proper performance of the above-mentioned works is essential for the safe operation of the boiler, correct operation of the boiler and central heating system, and user satisfaction
The boiler installation should be performed in accordance with the assembly manual, and the installations to which the boiler will be connected should be efficient and made in accordance with the relevant designs.
It is recommended that the installation of the boiler is entrusted to a qualified installer.

4.1 Boiler transport

The AGRO V2 and AGRO V2S boiler is transported on a wooden pallet and packed with plastic foil. The boiler should be transported in an upright position in a manner that protects it against mechanical damage. The boiler must be protected against the harmful effects of weather conditions.

The boilers must not be stacked during transport and storage. Loading and unloading should be performed with due care. In order to move the boiler in the warehouse and in its destination, forklifts must be used. Moving should be done carefully and slowly to prevent the boiler from tipping over. It is forbidden to hit the boiler, overturn or subject it to violent shocks. Unpacking the boiler may only be performed at the place of destination, immediately prior to assembly into the system.

4.2 Place of installation of the boiler

According to NormPN-87 / B-02411 "Built-in solid fuel boiler rooms" and in accordance with the Regulation of the Minister of Infrastructure of April 12, 2002 (Journal of Laws of 2002 No. 75, item 690) on technical conditions to be met by buildings - boiler for solid fuel should be installed in a separate room, boiler room (e.g. basement, room on the ground level or the level of heated rooms - rooms in the latter case only up to 25 kW).

The boiler should be placed on a fireproof base, the dimensions of which must exceed the boiler base by at least 500 mm on the front side of the boiler and 100 mm on the other sides.

It should be located in such a way that there is free access to the boiler, which is necessary for proper operation and cleaning of the boiler. The bearing capacity should be appropriate to the weight of the boiler together with water. The immediate surroundings of the boiler, i.e. walls and ceiling of the room, should be made of non-flammable materials.

4.3 Room ventilation

The room where the boiler is placed should have gravity ventilation ducts (without shutters):

air supply - an opening in a window or wall with a cross-section not smaller than 200 cm2 (for boilers up to 25 kW) or 20x20 cm (for boilers over 25 kW)

- exhaust - an opening, if possible, located at the chimney under the ceiling of the room, with a cross-section not less than 14cm x14cm.

CAUTION:

It is forbidden to use mechanical exhaust ventilation in the room where the boiler is installed.

4.4 Connecting the boiler to the chimney

Chimney flues should be made in accordance with the requirements of PN-87 / B-02411 and PN-89 / B-10245 "Smoke, exhaust and ventilation pipes made of brick. Requirements and tests upon acceptance "and the Ordinance of the Minister of Infrastructure of April 12, 2002 (Journal of Laws No. 75).

The boiler flue should be connected to the chimney by means of a flue gas connector made of steel sheet, which should be placed over the outlet of the flue, embedded in the chimney and sealed. The fastener should rise slightly upwards (minimum 1%). If, for construction reasons, the boiler flue has a length exceeding 400 mm, it is recommended to insulate the flue with thermal insulation.
The chimney should provide adequate draft for the correct operation of the boiler. The required chimney cross-section should be recalculated by the designer and depends on the height of the chimney, type (brick, steel), boiler power and fuel type. Steel chimneys should be 15-20% higher than brick chimneys, and if they are not thermally insulated, their cross-section should be 20% larger.

CAUTION:

The values of the required flue gas draft for individual sizes of boilers should be supported by the designer with calculations and selection of the chimney duct parameters (cross-section and height), taking into account climatic zones and terrain conditions.

The chimney to which the boiler is connected must be tight and free from other connections. It is recommended to insulate the chimney with thermal insulation.
The boiler flue should be connected directly to the chimney. If it is impossible for some reason, use a suitable fitting made of steel sheet, approx. 2 mm thick, rising slightly upwards from the boiler to the chimney. The connection should be sealed and insulated from the outside with mineral wool. The dimensions of the fitting should enable it to be put on through the flue.

CAUTION:

Before connecting the boiler, it is recommended to consult the chimney*arza*
The boiler must be connected only to a separate chimney duct ensuring the required draft.
The technical condition of the chimney to which the boiler is to be connected should be assessed by a chimney sweep.

It is recommended to prepare a construction design of the boiler room and heating system with the aerodynamic calculations of the flue gas exhaust system.

4.5 Connecting the boiler to the heating system

Central heating installations, depending on the object, may differ from each other, therefore the place and method of connecting the boiler should be in accordance with the guidelines in the design

An exemplary diagram of properly made protections for an open-source water heating device is shown in Figs. 2 and 3.

The water installation of the boiler should be made in accordance with the PN-91 / B-02413 standard and the BN-71 / 8864-27 standard. Deviations from the above-mentioned standards, irrespective of the threats to work and service safety, may cause serious boiler failures, which may result in the loss of the warranty. If for any reason it is necessary to build an installation containing such deviations, it is absolutely necessary to present such an installation for acceptance and periodical inspections to the competent inspectorate of the Office of Technical Inspection. In the latter case, it is very important to absolutely exclude the possibility of water pressure increase in the system above the value of the maximum operating pressure of the boiler, even during the tightness test of the system.

CAUTION:

1. ***The boiler may only be connected to a heating system of the gravity type or with forced water circulation, in an open system.***
   The installation in which the boiler will operate must meet the requirements of the Polish Standard PN-91 / B-02413 regarding the protection of water heating installations of an open system.
2. ***The boiler cannot be connected to a heating system made of plastics.***

In order to connect the boiler with the heating system, perform the following works:

- connect the return pipe from the installation with the boiler return stub pipe using a threaded joint - a flare nut,
- connect the system supply pipe with the boiler feed pipe using a threaded joint - a screw connection,
- check and install boiler accessories,
- connect the water supply to the heating system and the boiler.

Remember to properly seal the threaded connections with materials intended for this purpose, and to plug all unused stubs.

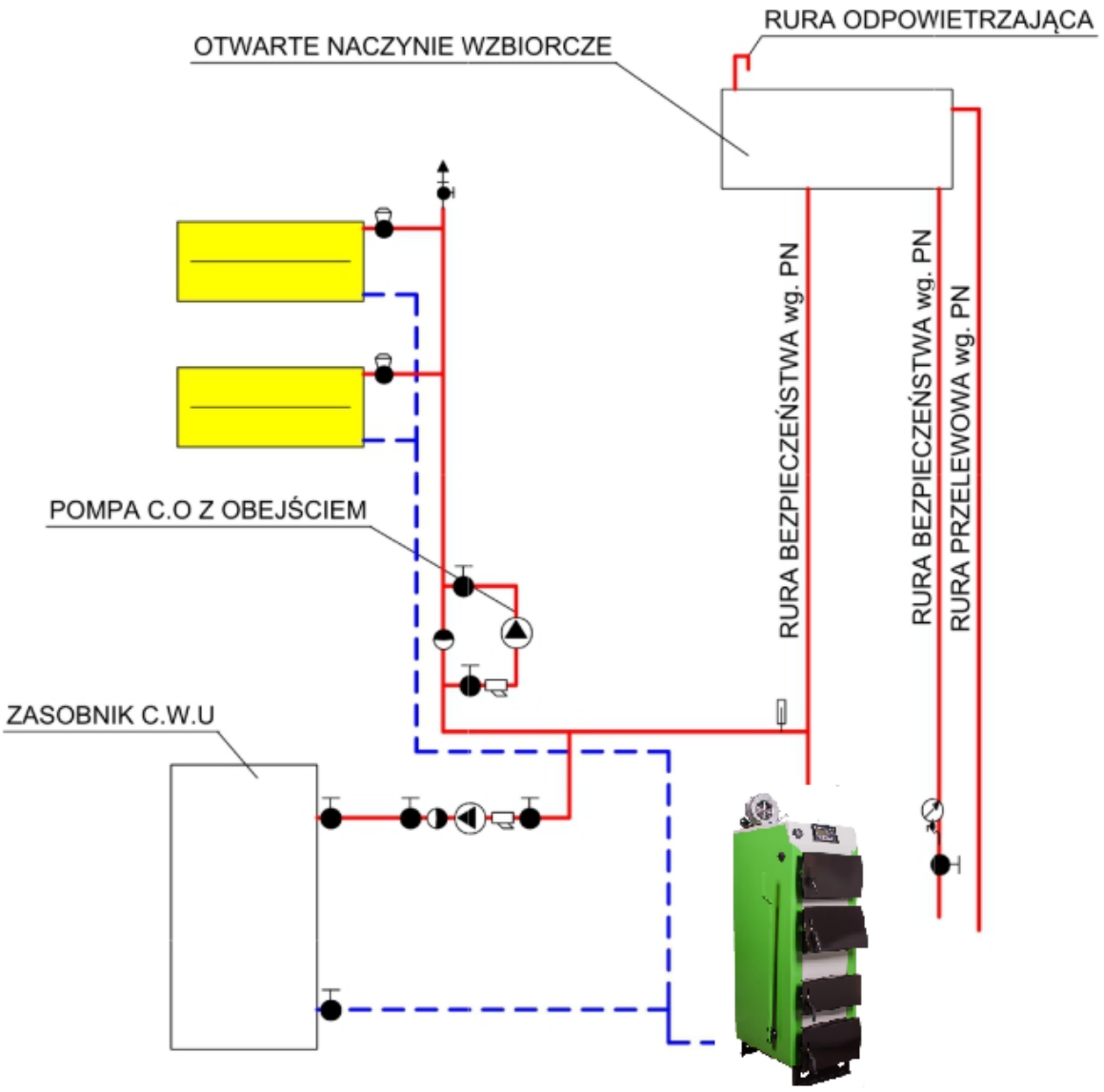
CAUTION:

In order to protect the boiler against returning to the exchanger from the water system with a temperature below 500C, it is recommended to use a heating system with mixing and adjust the parameters of the heating medium through a mixer or a coupling without interfering with the boiler operating parameters. Such systems combine two functions:

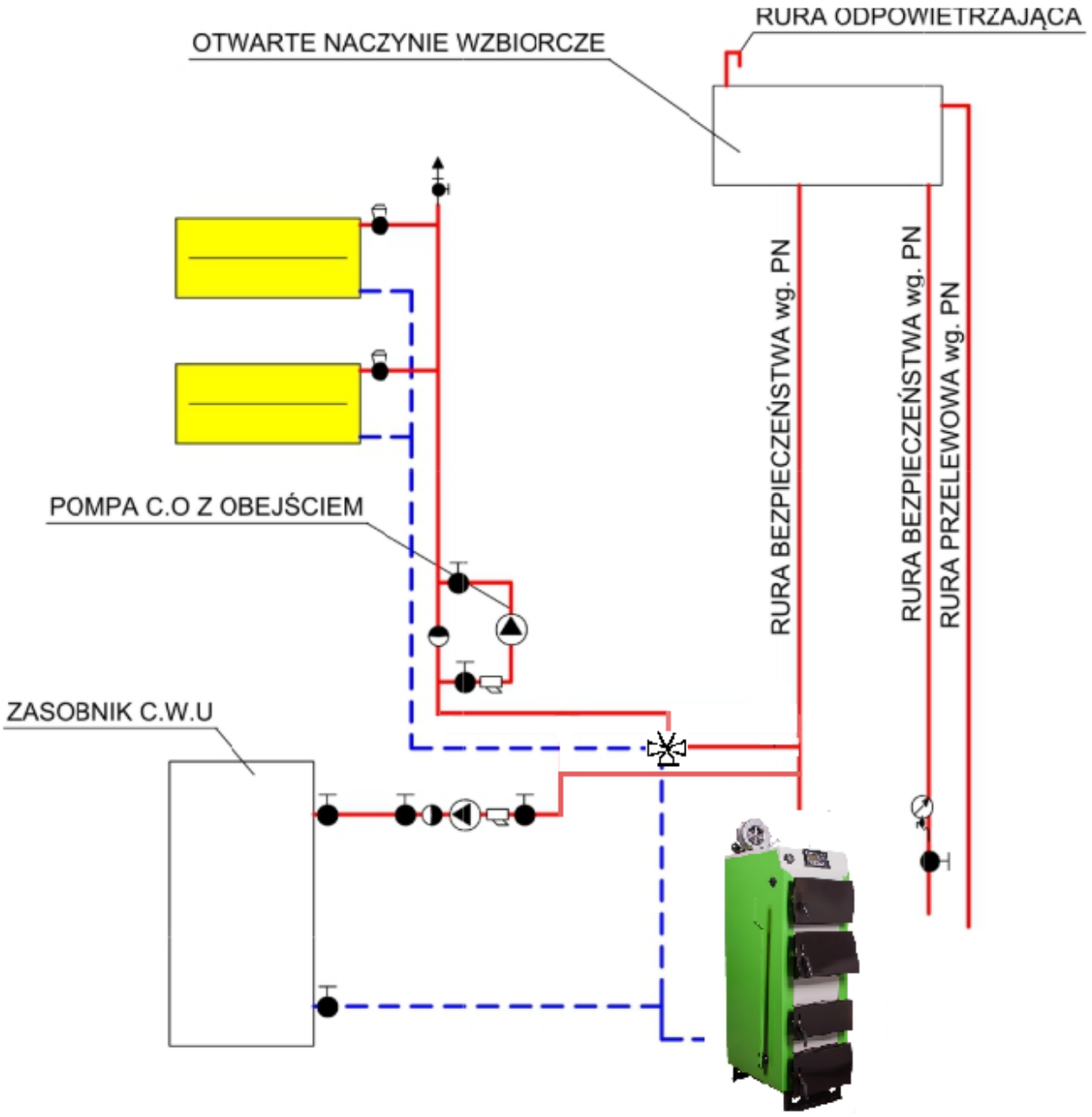
- ***they mix hot water from the supply with cooler return water and make it possible for the heating circuit to do so very smooth control of the heating water temperature in relation to the needs of the heating system,***
- ***protect the boiler against low-temperature corrosion and increase the efficiency of domestic water heating in the domestic hot water tank (if such is installed in the system and connected to***

the boiler circuit).

This allows to increase the efficiency of the system and the service life of the boiler.



LYNX. 2 - Diagram of the boiler installation in an open system in accordance with the existing regulations (without mixing)



LYNX. 3. Diagram of boiler installation with the use of a four-way valve

4.6 Filling the boiler

It is recommended to use soft water for filling the boiler (hardness not higher than 7 pH), without any mechanical impurities. Possible use of chemicals for water in the heating system in accordance with the recommendations of the manufacturers of the agents.

Water and materials in contact with water must comply with the PN-93 / C-04607 standard.

Water supply can be done through a drain cock mounted on the boiler drain stub, e.g. with a flexible hose, which, after filling the system, disconnect it from the boiler until the overflow is obtained from the signal pipe of the expansion vessel and the boiler drain cock is closed. It is recommended to make a connection for filling the system and filling losses in the system by means of a permanent connection, provided that the connection is equipped with a non-return backflow preventer to prevent the backflow of water from the heating system and shut-off valves (preferably with a pressure hose).

CAUTION:

Water quality significantly affects the durability of the central heating installation in this boiler.
If, for any reason, there is a lack of water in the boiler-system system, it is not allowed to refill the system with cold water. Cool down the boiler as soon as possible to 30oC (remove burning fuel if necessary) and only after the boiler has cooled down, refill water and start firing up from the beginning. The inflow of cold water to the boiler walls when they are hot may result in the destruction of the boiler. In extreme cases, it can result in damage to buildings and injuries to people.

Improper insulation / insulation / expansion vessel / overflow / can also cause the boiler to explode with all negative consequences.

The water frozen in the expansion vessel breaks the connection of the central heating system and the boiler with the atmosphere, and when the boiler water temperature increases, the pressure in the system increases in an uncontrolled manner, which in turn may lead to an explosion of the boiler.

4.7 Connecting the boiler to the electrical system

The boiler room should be equipped with a 230 / 50Hz electrical installation in accordance with the applicable regulations. The installation, regardless of its type, should be terminated with a plug-in socket equipped with a protective contact. Using the socket without the PE protective terminal connected may result in an electric shock.

The electrical installation may only be connected by an electrician with valid licenses. Any repairs to the boiler's electric power supply may only be performed with the fuse disconnected from the power supply.

4.8 Connection and installation of the regulator and blower to the AGRO V2 boiler.

In order to install the fan on the upper casing of the boiler, unscrew the plug of the blower duct, then install the fan in accordance with the manufacturer's instructions. Then dismantle the air damper system in the ash pan door and fix the dismantled plug from the upper part of the boiler with screws. This treatment will prevent the ash from escaping from the ash pan when the fan is started.

The regulator should be installed in accordance with the manufacturer's recommendations on the upper casing of the boiler, using sheet metal screws no longer than 10 mm.

4.9 Installation of temperature sensors and an emergency thermostat

The sensors should be installed in led out capillaries in the upper part of the boiler. In this case, the measured temperature will faithfully correspond to the temperature of the water in the boiler. The sensor should be mounted so as to ensure the best possible contact of the sensor with the inner surface of the tube intended for its installation.
DHW sensorplace inside the boiler in a special measuring well.

CAUTION

The temperature sensors and the emergency thermostat should not be flooded with oil, water or other liquids. Conductive silicone pastes can be used to improve contact. Do not put nails or other metal objects into the sensor and thermostat

4.10 Installation of the air draft regulator in the AGRO V2 boiler

In order to assemble the draft regulator it is necessary to:

1. Screw the thread (tapered 3/4 ") into the stub pipe - sleeve on the front wall of the boiler, the connection should be tight and ensure proper orientation. The draft regulator must be installed in such a way that the reference point with the arrow points upwards (the lever from the bottom of the regulator).
2. Put the lever in the place of the plug, move it to the side so that the chain is in line with the catch on the air damper in the ash pan door of the boiler and lock it (with a locking screw). The arm with the chain should point slightly downwards (approx. 2-5O).

5. AGRO V2 AND AGRO V2S BOILER OPERATION

5.1 Firing up in the AGRO V2 and AGRO V2S boiler

Before starting the fire in the cold boiler, you should:

- check if the central heating system is properly filled with water - until it flows out of the expansion vessel with the RS signal pipe (Fig. 3) and that the water in the system is not frozen.
- check whether the remains of unburned fuel and ash remaining after the previous use of the boiler have been cleaned and that the ash has been removed from the ash box.

Then you need to:

apply a kindling layer in the form of wooden flaps through the fire door, set fire to it and turn on the fan on the boiler operation regulator. Gradually sprinkle firewood on the burning wood.

During the fire-up period, close all doors, set the chimney draft control throttle in the flue to the fully open position (set the throttle axis along the flue).

When the layer of fuel is well ignited, it should be leveled over the entire grate surface and then, through the charging door, load the boiler chamber with fuel.

As soon as the required temperature of water in the boiler is obtained, the intensity of combustion should be adjusted. During normal operation of the boiler, it is necessary to periodically inspect and refuel as described above.

One-time charging of the boiler depends on the type of fuel. Before each charging of a new portion of fuel to the boiler, ash from the grate and remove the slag from the furnace.

In order to use fuel economically, the furnace chamber and boiler convection channels should be kept clean. The walls and the grate in the furnace chamber should be cleaned through the charging and furnace doors. Convection channels and the flue should be cleaned through the upper door of the boiler. Cleaning should be performed with the use of generally available tools (wire brush, scraper). The above-mentioned activities should be performed during the boiler's periodic standstill. Thorough cleaning of the boiler should be performed once a month, when burning lower types of fuel, these activities should be performed more often.

In the event of any disturbances in the operation of the boiler (excessive increase in water temperature, intense smoke escaping into the boiler room, etc.), pull the heat from the furnace through the furnace door (with the damper closed) to a metal container, which should be taken outside. The boiler room should be intensively aired during this time, and the boiler operator should be insured by a second person outside the boiler room.

A detailed description of the temperature control can be found in the regulator manual attached to this manual (for the AGRO V2S boiler)

CAUTION:

Before loading fuel or clearing the grate, it is absolutely necessary to turn off the blower and exercise particular caution. After a few seconds from turning off the fan, open the ash pan door and only after a few seconds the loading door. This avoids an "explosion of exhaust fumes". When opening the door, do not stand in front of the boiler and do not look into the furnace chamber while the boiler is operating. It may cause burns.

5.2 Method of adjusting the draft regulator

In the AGRO V2 version of the boiler adapted to the installation of a draft regulator, after setting the knob to 700C, insert the lever in the place of the plug, move it to the side so that the chain is in line with the catch on the air flap in the ash pan door of the boiler and lock it (with a locking screw). The arm with the chain should point slightly down (approx. 2-5O),

The adjustment consists in changing the length of the chain:

Set the knob to 700C,

Fire up the boiler by manually opening the boiler draft door,

- When the water temperature reaches 700C and it stabilizes, attach the chain to the boiler draft door in such a way that, with the chain tightened, the door remains open for about 1mm (the excess chain can be cut off).

CAUTION

- ***When firing up a cold boiler, vapors may condense on the walls of the boiler. In such a case, the boiler should not be put out of operation, but used further, which will result in the disappearance of the phenomenon. In the case of a new boiler, depending on the weather conditions and the temperature of the water in the boiler, the above phenomenon may last several days.***
- ***If there is any suspicion that the water in the system may freeze, before firing up the boiler, check the safety pipes leading to the expansion vessel for patency. For this purpose, water should be added to the boiler until an overflow is obtained through the signal pipe from the expansion***

vessel. If the safety pipes are not obstructed, it is forbidden to light the boiler.

5.2 The process of continuous burning in the boiler

During normal operation of the boiler, it is necessary to periodically inspect and refuel.

Before loading the next portion of fuel, you should rake the grate (using a scraper, a lever on the side of the boiler). Refueling consists in pouring an appropriate portion of it into the combustion chamber through the loading door.

It is recommended to operate the boiler above the temperature of 60°C. Long-term combustion at low temperatures causes flue gas condensation and faster boiler corrosion as well as precipitation of a large amount of tar from the fuel, which causes rapid tar fouling of the chimney and the boiler water body. Symptoms of such a state of affairs are: smoke leaking outside and "boiler explosions". In order to remedy this, it is necessary to clean the flue gas ducts and the surfaces of the water jacket of the boiler more often, as well as the chimney and the flue.

CAUTION:

When opening the charging door, be especially careful, as an explosive ignition of gases (fuel degassing products) may occur if they are opened suddenly. When opening the charging door, stand to the side of the boiler, slightly open the door, wait a moment until the exhaust gases are drained from the fuel container into the chimney, and then slowly open it completely. Also then, do not stand in front of the door opening. A similar principle should be adopted when opening the remaining doors while the boiler is in operation.

5.3 Disturbances in boiler operation - before you call the service

We remind you that in the event of an unjustified service call, the customer covers the costs of arrival and work of the service unit. Before you call for help from the factory service, please familiarize yourself with the following most common disturbances in the operation of the boiler, which are the result of improper installation of the boiler or incorrectly designed central heating installation.

SYMPTOMS	CAUSE	METHOD OF DELETION
Water (leak) is coming out of the boiler during the first start-ups	The so-called boiler sweating (condensation)	Fire up in the boiler and obtain the temperature above 80ºC and maintain it for min. 6-8 hours, repeat if necessary. Reduce heat consumption
Smoke is coming out of the charging or ash pan doors	Blocked chimney or channels in the boiler	Check the chimney patency and its parameters.
	Improper connection of the boiler to the chimney	Check the connection between the boiler and the chimney.
	Residual fuel has got under the hinge or sealant	Check the cord / sealant that seals the door
The desired temperature cannot be obtained on the boiler	Incorrectly selected boiler power (size)	Calculate the heat demand carefully, in accordance with the design and select the correct size of the boiler - replace the boiler.
	Fuel calorific value too low	Poor quality of fuel, e.g. high ash content with low melting point, low calorific value - inferior fuels should be burned in warmer periods, when lower efficiency is required.

	Insufficient chimney draft	Any leaks in the chimney, flue, boiler door or cleaning openings should be checked and removed - clean the chimney
	Contamination of the convection surfaces of the boiler	Clean the boiler convection channels.
Sudden increase in temperature and pressure in the boiler	Frozen vessel, circulation pump failure	Check safety tubes for obstruction. Insulate the expansion vessel
	Too little water in the system.	Check the amount of water in the installation
"Explosions" in the boiler	The occurrence of the so-called "Boiler explosions" is related to the lack of patency of the convection channels and the chimney.	Cleaning the boiler and chimney, sealing the walls of the chimney.
Excessive water temperature in the boiler	Closed valves. No heat is drawn off. Open air supply.	Open the valves. Close the air damper.

TABLE 1. Disturbances in boiler operation - before you call a service technician

CAUTION:

In the event of disturbances in the operation of the boiler - the necessity of its emergency shutdown (excessive increase in water temperature, intense smoke escaping into the boiler room, etc.), disconnect the voltage supplying the fan and the boiler controller, through the furnace door, pull the heat out of the furnace into a tin container, which should be taken outside. The boiler room should be intensively aired during this time, and the boiler operator should be insured by a second person outside the boiler room. Only after the boiler and heating system have cooled down, should the diagnosis of the causes of the failure begin.

5.4 Taking the boiler out of operation

After the end of the heating season or in other cases of the planned shutdown of the boiler, the fuel portion filled in to the furnace should be burned out, and after the boiler has expired and cooled down, the remains of the fuel should be removed from the furnace and ash pan. Then perform a visual inspection of the boiler (inside and outside) and accessories, and then carry out maintenance activities.

CAUTION:

Water should not be emptied from the system unless there is a clear need (such as the need to eliminate leaks). Water should be in the system all year round because it effectively protects the boiler and the installation against corrosion (from the inside). The exception to this rule is a break in heating during frost.

5.5 Boiler maintenance

Each summer break in the boiler operation should be used to protect the device against excessive wear and tear and prepare it for operation in the next heating season. To achieve this goal:

thoroughly clean the grate, furnace, ash pan, convection channels and the boiler flue,

clean the external surfaces of the boiler and associated devices, fill in any losses of anti-corrosion coatings and, if necessary, make them anew.

Preserve the internal surfaces of the combustion chamber and convection channels with a thin layer of oil and graphite

In order to obtain economical fuel consumption, the furnace chamber and boiler convection channels should be kept clean. In the furnace chamber, clean the walls, the grate deck through the charging door and the furnace and ash-pan doors. Convection channels and the flue should be cleaned through the boiler cleanout, and the dirt removed through the ash pan.

The channels should be cleaned with wire brushes on extension cords and various types of scrapers and steel spatulas. The above activities should be performed while the boiler is in standstill. Thorough cleaning of the boiler should be performed at least once a month, while burning inferior types of fuel (containing a larger amount of ash), these activities should be performed more often.

6. BASIC RULES OF SAFE BOILER OPERATION

During the operation of the boiler, the following rules must be followed in particular:

Installation of the boiler and central heating network as well as security should be in accordance with the requirements of PN-91 / B-02413.
During the operation of heating devices, the following rules must be observed in particular:

1. Before lighting a fire in the boiler

   check if the installation is properly filled with water,
   check the flue pipe with accompanying devices (throttle, cleanouts, etc.),
   make sure that the expansion vessel with the inlet and outlet pipes is technically efficient and not free from obstruction.
2. When operating the boiler, use appropriate personal protective equipment (appropriate clothing, protective goggles, gloves, shoes).
3. If there is a break in heating during frosts, it is obligatory to drain the water from the installation to prevent its destruction due to bursting.
4. Provide proper supply and exhaust ventilation in the boiler room
5. Ensure that the walls, floor and ceiling of the boiler room are not flammable and that the floor is capable of bearing the weight of the boiler.
6. Re-read point 5 of this manual and follow the instructions contained therein.
7. Remove flammable and caustic materials from the vicinity of the boiler and the boiler room.
8. Never pour water over the fire in the furnace to extinguish it (the fire can be extinguished by blowing the heat out of the furnace or by covering it with sand or ash).
9. Do not use mechanical exhaust ventilation in the boiler room.
10. Only clean the boiler when it is not burning.
11. Never use any fuel such as diesel or gasoline or the like to light the fire.
12. It is not allowed to introduce any changes in the design of the boiler and installation on one's own.
13. It is recommended to wear protective gloves to service the boiler.
14. It is necessary to take care of fire safety, the surroundings of the boiler should be tidy, no flammable materials should be stored nearby.
15. If it is found that there is no water in the system during boiler operation, it is forbidden to refill the system with cold water - risk of explosion.
16. After the boiler is put out, the furnace and ash chamber should be cleaned and empty.
17. The temperature and pressure of water in the boiler must not exceed the permissible values, the water in the boiler must not be boiled. The water temperature should always be below 95oC.
18. The boiler should be operated by a person trained by the manufacturer or a person authorized by him.
19. Boiler maintenance must not be entrusted to minors or intoxicated persons.
20. The expansion vessel, expansion pipe, overflow pipe and signal pipe should not be completely or partially located in a room where the temperature may drop below 0 ° C.
21. No valves or other fittings reducing the internal cross-section may be installed on the hydraulic conduits connecting the boiler water jacket with the expansion vessel.
22. When staying near the boiler, pay special attention to uninsulated surfaces of the boiler (doors, cleanout covers), which may heat up to high temperatures (above 100°C). Direct contact with these components may result in burns. Use protective gloves for handling.
23. Use only water (preferably treated water) as a heating medium.

24. Clean the boiler only when the boiler is not in operation. When cleaning the boiler, the boiler room should be well ventilated

7. TERMS OF WARRANTY

1. The manufacturer provides a 60-month warranty from the date of purchase for the tightness of welding connections and 24 months for the remaining elements: fan, controller (depending on the type of boiler), 12 months for wearing components(sealing cord, fireclay plates)

2. The manufacturer provides free repair of defects arising during the warranty period due to the manufacturer's fault, within 30 days from the date of reporting the failure.

3. Elements that wear during operation cannot be repaired or replaced: door and cleanout gaskets, steel screen inserts.

4. Complaints are not subject to: condensation of tar in the boiler and the chimney channel (which is caused by inadequate chimney draft, lack of fresh air supply to the boiler room and / or too moist fuel, improper selection of the boiler to the size of the heated rooms).

5. The warranty is extended for the period from reporting the failure to the date of removing the defect.

6. Electrical connection to the boiler by a person who does not have the appropriate authorization, any unauthorized repairs to the boiler, changes in its construction or insulation during the warranty period, by the buyer or unauthorized persons, are not allowed and will invalidate the LV. warranty conditions.

7. Damage to the control caused by overvoltage in the electrical system is not covered by the warranty.

8. Lack of obligatory inspections and recorded so-called Zero start-up of the boiler by an authorized fitter, confirmed by an entry in the "Service card of the device", as well as the lack of financial settlement of the boiler repair due to the customer's fault, result in the loss of the warranty.

9. Having a warranty card stamped by the manufacturer and installer is a condition for free repair.

10. Every boiler inspection should be notified to the manufacturer by distributor or final customer including date and boiler condition.

11. As a result of the fact that it is impossible to repair by the manufacturer's service, the boiler will be replaced free of charge with a new one.

12. In the event of an unjustified complaint, the service travel costs are covered by the user.

13. The warranty does not cover maintenance and cleaning of the boiler.

14. The warranty is withdrawn in the event of damage as a result of:

- improper transport and storage of the boiler,
- improper installation of the boiler to the heating system and the chimney (e.g. the requirements of the Polish Standards PN-91 / B-02413 regarding the protection of devices, water heating of the open system and expansion vessels of the open system must be met. closed.)
- corrosion of steel elements of the boiler resulting from condensation of water and combustion products caused by the constant use of moist fuels while maintaining a low temperature of return water below 500C,
- used to supply water with a hardness below 5 pH or above 7 pH
- improper maintenance,
- mechanical violations,

- exceeding the permissible operating pressure (bulging, cracks in the boiler, etc.)

15. The warranty period and terms of the additional equipment are included in the warranty cards of their manufacturers. The manufacturer of the boiler is not responsible for any difficulties in the operation of the boiler caused by the failure of the above-mentioned devices. Their manufacturers ensure the repair of defects arising during the warranty period within 14 days from the date of receipt. Damaged the above-mentioned elements of the boiler equipment should be sent directly to its manufacturer or via the point of sale. The device should be accompanied by a warranty card and a description of the damage. The costs related to transport, insurance and ensuring proper packaging are borne by the customer.

16. The manufacturer does not provide replacement devices for the duration of the warranty repair.

17. The manufacturer is not responsible for incorrect selection of the boiler to the size of the heated surfaces.

18. Complaints should be submitted to the manufacturer's address:

- e-mail:serwis@mce.net.pl
- Mobile phone. 509 810 955
- tel.fax: 33 872 25 11

The complaint should include:

- boiler type, size, serial number
- date and place of purchase
- a detailed description of the damage
- the exact address and telephone number of the person submitting the complaint

8. DEVICE SERVICE CARD

MAŁOPOLSKA ECOLOGICAL CENTER
"MCE" S. Migdałek P. Kozłowski sc
32-124 Klecza Górna
Klecza Dolna 15a (near Wadowice)
voiv. Lesser Poland

Boiler serial number:

Boiler thermal power [kW]:

Year of production:

Sale date:.....

Seller's signature and stamp

USER

Surname and name:..... .....
.....

.....

Tel .:..... .. ..

Boiler installation address: .....

.....

.....

.....

INSTALLER-Installation contractor (boiler installer and commissioning company)

The installation was carried out in accordance with the provisions of construction supervision and applicable law, and also successfully launched.

Boiler installation date:

Installer stamp and signature:

BOILER OPERATION PARAMETERS AT THE FIRST START-UP

1. Chimney draft:.....Bye
2. Exhaust gas temperature:.....^{0}C.
3. CO2 content in the flue gas:.....%
4. CO content in the flue gas:.....%
5. Boiler water temperature:.....^{0}C.

Date and signature of the installer: ....

The user is acquainted with the safety regulations and the rules of operation, maintenance and installation of the boiler.

Date and User's signature: ....

Only authorized personnel may fill in

DATE	SCOPE OF PERFORMED WORKS	BUSINESS	SIGNATURE SEVISANT

(notes)

(notes)

(notes)

(notes)

(notes)

(notes)

(notes)

(notes)

(notes)

(notes)

(notes)

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