



## WOOD STOVE

### BALKAN ENERGY BELLAROSA

## INSTRUCTIONS FOR INSTALLATION AND OPERATION

### TECHNICAL DESCRIPTION

Balkan Energy stoves are designed for heating domestic and public spaces using solid fuel. The stated heat capacities of the models have been established after research, according to standardized conditions. Achieving the desired power depends on the selected fuel with the required calorific value and moisture; its successive kindling and addition; regulation of primary and secondary draft and thrust; the organization of effective air heat exchange, etc.

To calculate the required power, it should be taken into account that for the heating of 1 cubic m. room, 25 to 180 W of power is required, depending on exposure, insulation, outside temperature and winds.

Nominal heat output	29.16kW	Average CO at 13% O <sub>2</sub>	1468mg/Nm <sup>3</sup>
Nominal water heating output	16.46kW	Average NOx at 13% O <sub>2</sub>	109mg/Nm <sup>3</sup>
Space heating output	12.70kW	Average OGC at 13% O <sub>2</sub>	112mg/Nm <sup>3</sup>
Fuel	6.807kg/h	Dust content in products	37.5mg/Nm <sup>3</sup>
Emissions	20.14g/s	Efficiency	81.2%

### ASSEMBLY INSTRUCTIONS

All local legal regulations, including those relating to national or European standards, must be observed when installing the products.

The stove is placed on a stable, horizontal, non-combustible floor with sufficient load capacity. To protect the floor, a stable, non-combustible underlay can be used that projects in front of the fireplace at least 50 cm in front and 30 cm on the side.

In the radiation area of the stove, at a distance of 100 cm around it, there should be no combustible objects that can be damaged by the radiated heat.

Before connecting the stove to the chimney, consult a specialist.

Before connecting the fireplace to the chimney, consult a specialist.

The connecting elements (socket and flues) must be installed tightly and permanently, but in such a way that they do not enter the passage section of the chimney.

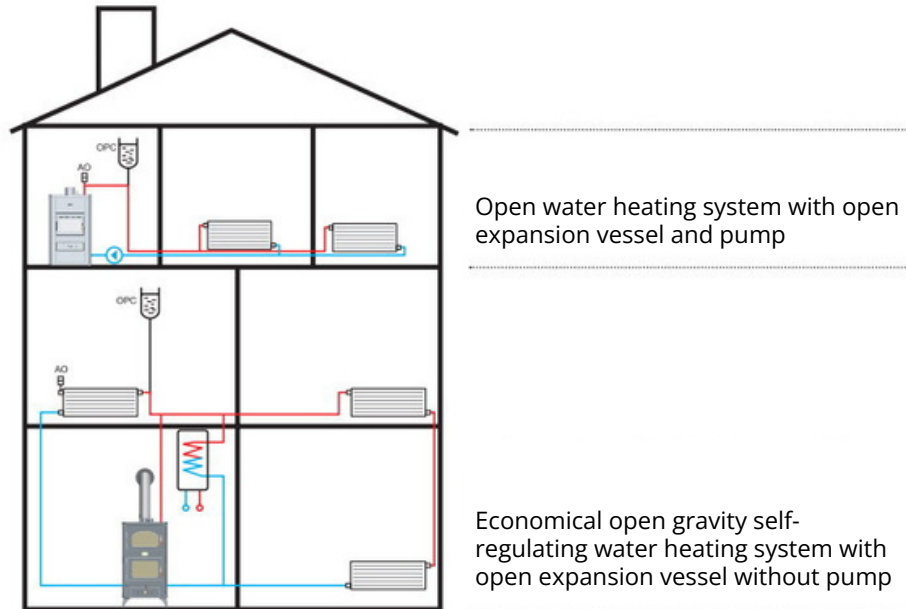
The flues should be the same size as the stove insert.

The stove must work with a separate chimney.

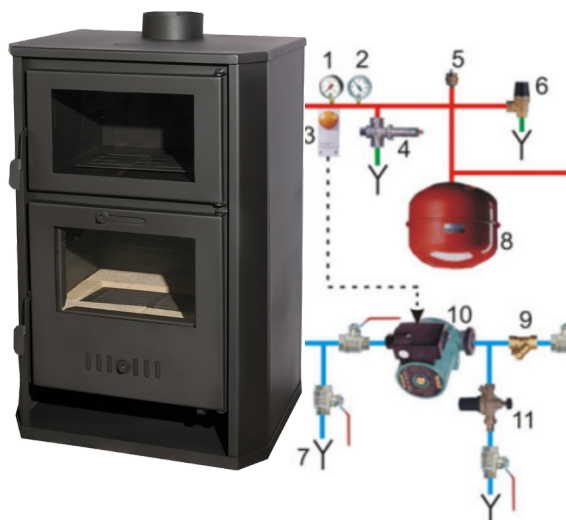
Fresh air must be supplied to the stove at least 4 cubic meters per hour for each kilowatt of heat output. If necessary, inflow from adjacent rooms or outside air is ensured.

The combustion process of the stove must not experience a lack of air under the action of gravity or forced aspiration, as this is a prerequisite for incomplete combustion or the return of exhaust gases to the premises.

## EXAMPLE SCHEMES OF OPERATION OF A STOVE WITH BACK BOILER IN AN OPEN SYSTEM



## EXAMPLE SCHEMES OF OPERATION OF A STOVE WITH BACK BOILER IN A CLOSED SYSTEM

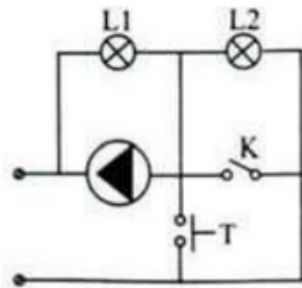


1. Manometer;
2. Thermometer 120 °C;
3. Electric thermostat;
4. Thermal safety valve;
5. Automatic airvent;
6. Hydraulic safety valve;
7. Drainage, draining;
8. Closed expansion vessel;
9. Filter;
10. Circulation pump;
11. Automatic feeder.

## Basic rules and recommendations

- Before building the installation, it is recommended that a specialist calculate the heat losses for the specific case.
- We recommend connecting the stove to an open heating system. When connecting in a closed system, it must be secured with a safety hydraulic valve.
- To ensure ventilation of every branch and element of the installation at every moment of its operation.
- All elements of the installation must be protected against freezing, especially if the expansion tank or other parts of it are located in unheated rooms.
- In installations with forced circulation, the pump must be provided with a backup power supply - a battery with a converter 12V / 220V (50Hz) in autonomous mode.

**It is recommended to switch the circulation pump on and off with a thermostat, duplicated with manual electric switch.**



L1 и L2 - signal glow lamps

K - ordinary key

T - thermostat

\*Operating mode: L1 is lit, the circulation pump is running.

\*\*Standby mode: L2 on, pump not running.

There is electrical voltage.

\*\*\*Emergency mode: L1 and L2 are off.

There is no electrical voltage.

- The first service cleaning of the pump filter should be carried out immediately after the installation has been made.
- If an old installation is used, it must be repeatedly flushed from the accumulated dirt that would settle on the surfaces of the back boiler.
- Do not use dirty and wet wood or biomass. The wood must have been kept for at least two years in a dry and ventilated place.
- Do not drain circulating water from the installation during the non-heating season.

### **During the first 3-4 ignitions it is possible:**

- the formation of condensation on the surfaces of the back boiler. The scum that forms reduces the sharp temperature difference and the amount of condensation.
- burning of the paint on all painted surfaces, including the oven. It is recommended to ventilate the room. After the installation, a 72-hour test of the installation in operational conditions should be carried out.

## USER GUIDE

The stove with back boiler works on the principle of a boiler for water heating. The advantage of this type of heating systems is the maximum use of the heat released during the combustion process. In this method, the heat from the combustion chamber is taken to remote and hard-to-reach rooms for ordinary heat exchange in order to maintain a uniform temperature and thermal comfort.

**A stove with back boiler should not work without water in the heating system!**

### **Fuel**

Use only chemically untreated natural wood as well as wood briquettes without binding adhesives.

It is important that the wood is dry - with a moisture content of  $16 \pm 4\%$  in accordance with EN 13240.

Wood with a moisture content below 20% is called dry. This is obtained by staying in a dry and ventilated place for at least 2 years. Wood is stored split and stacked, and its thickness should be between 5 and 15 cm.

Why shouldn't wet wood be used?

- moisture in wood reduces its heat of combustion. A large part of the heat is used to evaporate the water, and the rest may be insufficient to provide the necessary heating. For example: 20 kg of wet wood can mean 10 kg of dry wood and 10 liters of water added to the fire.
- water vapor lowers the combustion temperature and contributes to the formation of soot, which accumulates and forms a black, hard layer on the walls of the combustion chamber, glass ceramics, chimneys and chimney.
- environmental pollution increases, because the gases leave the chimney unburned.

## Ignition

The purpose of the kindling is to preheat the walls of the combustion chamber, the flues and the chimney to create draft through a steady, vigorous fire without having to open the door frequently to readjust it.

1. Before lighting, clean the ashes from the grill.
2. Fully open the primary air and flue gas dampers.
3. Place two split pieces of wood in the firebox parallel to each other, on either side of the grill.
4. Crumple up the paper and place it in the front of the grill between the logs. Do not use glossy or coated paper.
5. Place small, dry kindling on the paper. Kindling made of soft wood are preferred. Arrange the kindling so that they do not collapse and suffocate the starting fire. Place some finely chopped wood on top of the kindling.
6. Light the paper. When the paper ignites, close the combustion chamber door.
7. Leave the primary air valve fully open until the flame has engulfed the entire combustion chamber.

The heat-resistant paint with which the stoves are painted is forcibly dried in the manufacturer's factories, and during the first one or two ignitions, it self-bakes and becomes mechanically resistant. During the self-baking of the paint, ventilate the room from the emitted fumes.

## Loading with wood

The heat emitted by the fire is not constant over time, as wood burns best in cycles. A cycle is the time from the ignition of the wood loaded on the embers to their transformation into a new layer of embers. Each cycle can provide heating for a different amount of time, depending on how much wood, how big it is and how it is loaded.

Finely chopped wood piled crosswise burns faster because the incoming air has a chance to reach all the pieces at the same time. Such an arrangement is suitable when intensive heat release is required.

To achieve a long stable fire, collect the coals on the grill and load them compactly with larger logs. The dense, parallel arrangement of the wood prevents air and flames from penetrating between them and preserves the interior of the bowl for later burning. Fully open the primary air. As the outermost wood ignites, reduce the air to your desired burn intensity.

How much wood is needed depends on the power of the stove and the desired heating. The amount of dry wood to load is 0.36 to 0.5 kg per hour for each kilowatt of useful heating power. The smaller number is for drier wood.

## Chimney

The chimney is designed to draw the products of combustion from the fireplace and throw them into the atmosphere outside the premises. The upward draft or "draft" of the chimney is the result of a combination of its height and the temperature difference of the flue gases and the outside air. The column of hot flue gases in the chimney weighs less than the equivalent column of cold outside air, so the pressure at the top of the warm chimney is less than the outside air pressure. This very small difference in pressure creates thrust.

Lower draft is a prerequisite for difficult ignition, flue gas return and is overcome by quickly igniting and burning dry, thin and wildly burning kindling. After lighting the fire and heating the chimney, its thrust increases. For economical mode and high efficiency after heating the chimney, the draft should be reduced to 5-10 Pa, but so that there is no return of exhaust gases /smoking/ with the door closed.

### The main reasons for poor draft are the following:

- accumulated soot inside the chimney, which reduces its cross-section and increases the resistance of rising exhaust gases;
- cracked chimney wall or loose rosette;
- loose smoke pipes or pipes inserted deep into the chimney, thus reducing or blocking its cross-section;
- the use of one chimney with a small draft of several stoves at close levels;
- smoking also occurs when the weather has suddenly warmed up outside - the warm gases from lighting the fire cannot flow through the cold chimney. In this case, a larger amount of fast-burning kindling is used. The same effect is produced by attempting to light a stove on the first floor when the same or an adjacent chimney is already being used by a fireplace on the top floor.
- in the case of an unsealed ceiling or open windows on the upper floor, the "staircase-chimney" effect is obtained, creating a back draft;
- for a chimney located in an area of overpressure caused by wind.

With proper connection, distribution and maintenance, the stove does not release smoke emissions into the room. If this does occur, the room is ventilated and the cause of the smoke must be found and removed.

**Do not burn:** household waste, glued or painted wood, plywood or chipboard, wooden sleepers or other waste containing artificial chemical impurities, because poisons do not burn, but only change their appearance and, when released into the atmosphere, lead to unpredictable consequences.

### **Maintenance, cleaning and storage**

During operation, the stove door must be closed. When opening the refueling door, the primary air vents are closed and care is taken to prevent fuel from knocking over and falling out of the stove.

The power of the stove is regulated using the primary air flaps.

Do not touch the stove with bare hands while it is hot.

The ashtray should be cleaned daily. Do not dispose of ashes in plastic containers.

Regularly clean the passage sections of the flue gases in the stove and chimneys.

The painted surfaces are cleaned with a slightly damp cloth. Do not use cleaning agents. If you want to refresh the paint, use a suitable spray bottle.

For easier cleaning of the cavities in the cooker, the movable bottom of the oven is raised.

The glass is wiped with a damp cloth, and if necessary it can be washed with detergents or water. Tempered glasses are washed and dried in a cold state.

To prevent condensation and possible corrosion, when the stove is not in use for a long time (for example during the non-heating period), it must be cleaned of ash and fuel residues, and the regulating elements - open, for good circulation around and through the stove.

Do not make unauthorized changes to the structure!

When repairing, use original spare parts from the manufacturer.

**The installation and start-up of the heating system must be carried out by an authorized person to ensure the faultless operation of the entire system. In case the installation is carried out by a person, which engages in construction activity (unauthorized), material responsibility is borne by the person who installed the heating system, and not a manufacturer, representative or retailer.**

