

INSTALLATION AND OPERATING INSTRUCTIONS



STOVE WITH HOTPLATE AND GLASS OVEN **COLORADO**

The COLORADO series of furnaces are economical and highly efficient heaters designed for heating residential and industrial spaces - service stations, workshops and garages, greenhouses, etc. They are equally well suited for permanent space heating as well as for temporary and periodically occupied spaces.

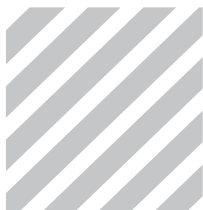
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1 INTRODUCTION

This installation and operating manual is valid for two furnaces, for heating industrial and residential premises, in standard sizes.

The ovens for heating and cooking (COLORADO series) are economical and highly efficient heating appliances, which are convection type heaters and run on solid fuel. Main operating mode of the oven is glowing combustion (the principle of operation of a wood gas generator). The operating mode is set by the user and depends on the quantity and speed required to achieve the desired temperature in the space to be heated. The heated air heats evenly the volume of the space to be heated.

Furnace weather resistance type - UHL category 4.2 according to GOST 15150 requirements.



WARNING! Before proceeding with the installation and use of the oven, please read these installation and operating instructions carefully.

WARNING! The manufacturer accepts no responsibility for failure to observe the installation and operating instructions.

2 TECHNICAL DATA

The stove will be produced in series in two standard sizes, designed to heat spaces with a volume of 130 and 260 m³, with a maximum heat output of 7 and 12 kW respectively.

All models share a common purpose, operating principle, component layout and fuel used.

The models differ in overall dimensions, weight, combustion chamber volume, convection tube diameter, total heating surface area and stack height. The main technical characteristics of the heating and cooking stoves are shown in Table 1.

3 THE DEVICE AND HOW IT WORKS

The heating and cooking furnace (Figure 1) has a simple, highly efficient and reliable welded construction of the original thermal type, made of special structural steel.

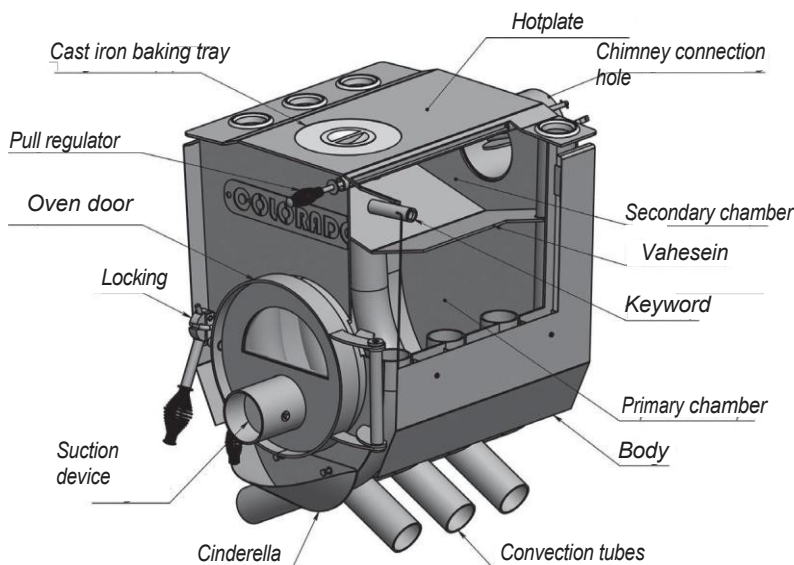


Figure 1. Description of the furnace

Table 1.

Colorado 00

Colorado 01

Model	Standard	Glass	Cooking plate	Glass + baking tray	Standard	Glass	Cooking plate	Glass + baking tray
Rated power, kW				4				7
Maximum power, kW				7				12
Volume of space to be heated, m ³				130				260
Dimensions (length*height*width), mm	695 * 490 * 665				807 * 540 * 687			
Weight, kg	67,36	66,74	67,24	66,62	83,78	83,16	85,65	83,03
Number of convection tubes				7				7
Oven capacity, dm ³				43				62
Stack diameter, mm				120				120
Stack height (minimum), m				5				6
Length of stalks, mm				370				450
Working time per kilogram, in hours				6-8				6-8

* the volume of the room to be heated is and depends on many factors, e.g. given in the instructions.

for example - heat loss through the enclosures

construction; ceiling height; ventilation; moisture content of firewood, etc.



This type of heater has a two-burner stove, in which the method of incineration is (according to the "wood gas generator" principle) combustion of the fuel and post-combustion of the furnace gases in two stages.

The flue gases formed by the glowing of wood in the lower (primary) chamber enter the upper (secondary) chamber where they are combusted, supplying heated air (oxygen) from the boiler room via special inlet openings.

As wood does not burn but glows, one bag of wood is sufficient for 6-8 hours of continuous operation (depending on fuel density and humidity). The oven is equipped with convection tubes for efficient heat exchange. The cold air from the room to be heated enters the oven through the lower openings of these tubes and returns through the upper openings to the room, which is heated to a temperature of 60-80 °C.

The air is thus heated evenly and moves throughout the room. The tubes are in full contact with the furnace, immediately absorbing the heat generated and quickly transferring it to the room to be heated. The good heat removal from the walls of the oven, due to the powerful convection currents formed, ensures efficient heat removal from the side surfaces of the oven.

A partition separating the primary and secondary chambers also helps to achieve optimal ventilation of the upper ends of the convection ducts.

temperature. The fuel is fed in through the oven door, which is quite large to allow large stacks to be loaded into the oven. The eccentric locking of the door handle ensures a reliable and tight closing.

On the charging door there is a regulator for the suction device (power regulator), which can be used to regulate the intensity of fuel combustion. The post-combustion mode of the stove gases emitted from the fuel is determined by the stack damper (gas burner regulator) and is selected in each case individually, based on experience and depending on the stack design.

The chimney damper regulator has a cut-out sector equal to 1/4 of the cross-section to prevent the ingress of the flue gas into the space to be heated. The ash bag protects against possible hot pieces of coal falling on the room floor.

The upper surface is used as a cooking surface (Figure 1). To speed up cooking, a cast iron baking tray can be placed on the cooking surface (Figure 1).

All the outer surfaces of the oven are painted with heat-resistant silicone enamel, which retains its properties even at high temperatures.



NOTE!!! The oven is designed to operate in glowing mode only. The use of the oven in open flame mode is strictly prohibited (open flame is only allowed during ignition, prolonged use of the oven in intense flame mode will reduce its lifetime).

NOTE!!! The baking tray heats up to a high temperature.

NOTE!!! The manufacturer reserves the right to make changes in the construction and design of the oven which do not affect its performance.

4

SAFETY RULES

NOTE! For the safe installation and use of the heater, follow the requirements and recommendations set out in this manual and the following regulatory documents:

-NAPBA.01.001 - 2004 Fire safety rules

-SNiP 2.04.05 - 91 Heating, ventilation and air conditioning.

In addition, whenever you have questions, you should always consult your local fire inspector.

5

FURNACE INSTALLATION

Before installing the stove, it is important to make sure that the room where the stove is to be installed has the necessary fresh air intake for wood combustion in order for the stove to function normally.

In order to ensure an adequate air supply for stoves of 35 kW or less, the room in which such a stove is installed shall have at least an openable front door or window. In any case, the size of the installation space shall be 4 m² per 1 kW heat output.

The installation location of the stove must be chosen to ensure not only the most efficient heating of the space to be heated, but also free access to the oven for inspection and cleaning. The floor under the stove must be made of non-combustible materials.

In addition, the stove must be installed on a metal base at least 0,2 m high or on a brick base as shown in Figure 2. The combustible and flammable material floor under the oven door shall be protected by a metal sheet 700 x 500 mm placed lengthwise of the oven. aside. The distance from the oven door to the opposite wall must be at least 1,25 m.

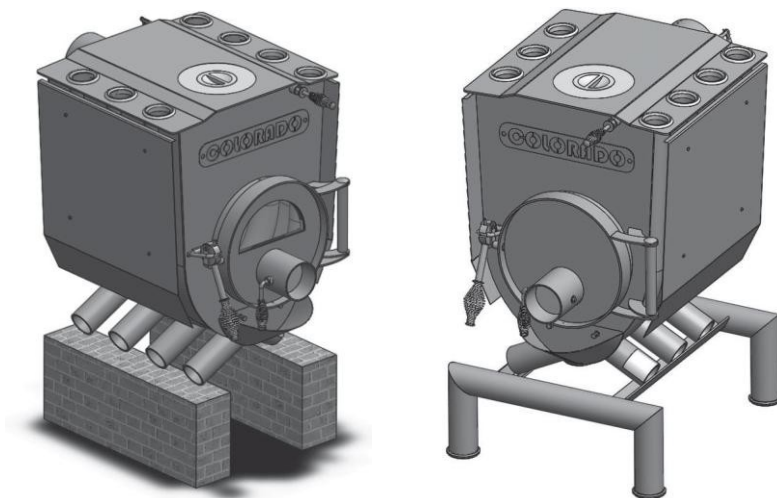


Figure 2. Oven installation options

Metal stoves shall be installed at least 1 m from structures made of materials of fire hazard groups G3 and G4 and at least 0,7 m from structures made of materials of fire hazard groups G1 and G2 (Figure 3).

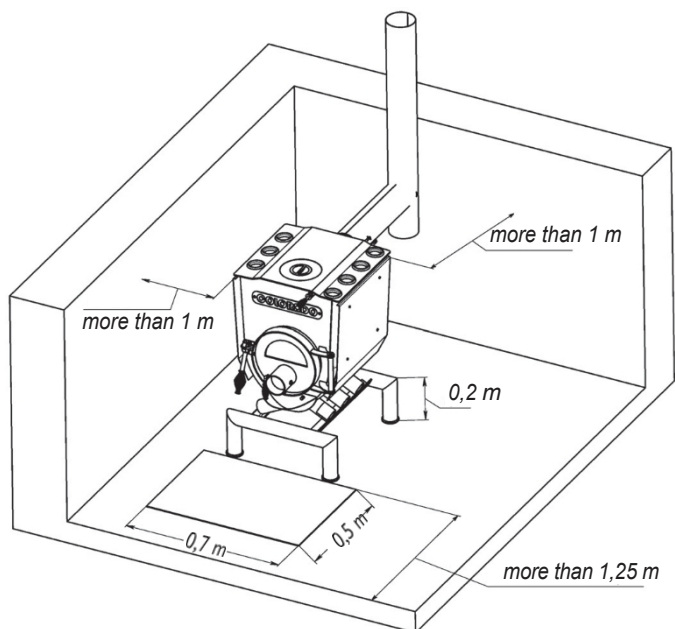


Figure 3. Diagram of the installation of the oven

If you are using the stove to heat commercial or warehouse areas, the distance from goods, shelves, cupboards and other equipment must be at least 0.7 m and from the stove door at least 1.25 m.

When installing the stove, the rear of the stove must be raised by 1 to 5° from the horizontal line to ensure traction.

6

CHIMNEY INSTALLATION

Due to the fact that the stove has an optimised fuel combustion process (to increase operating time and improve efficiency), the rules for the use of the stove impose strict requirements on the materials from which the chimney is made and the conditions for their installation.

Let's briefly look at the basic requirements for modern chimneys.

- 1 When flue gases pass through the stack, they are cooled naturally by heat transfer to the stack walls. Thus, the more massive the chimney, the faster the flue gases lose their heat, and so more energy is needed to heat it. As the temperature of the flue gases is not high in a modern high-efficiency furnace, their energy may not be sufficient to heat a massive brick structure over the entire height of the stack.
Reducing the temperature of the flue gases will lead to a strong attenuation of the flue gas outflow. As a result, the draft is reduced, the stove starts to smoke, etc. This is why modern chimneys have become a must for their rapid heating, low heat capacity and reduced weight.
- 2 As you know, flue gases rise because of their heat (energy), in other words their temperature.
And when the chimney is cold (both the chimney material and the air inside) and the flue gas temperature is not high, the situation arises where the flue gas energy is not sufficient to reach the air cap in the cold part of the chimney.
to "break through". The insulation of the chimney prevents it from cooling. This implies a requirement that the parts of the chimney that may be exposed to cold (attic, street), i.e. the pipes outside the heated rooms, must be insulated with basalt wool of 30-50 mm thickness.
- 3 As described above, their natural cooling takes place as the exhaust gases pass through the stack. Often, the temperature of the flue gas falls below the dew point, resulting in a rich, chemically highly aggressive



condensation and a layer of soot builds up on the inside walls of the stack. If the chimney is made of a material that cannot withstand the aggressive acidic environment of condensate, it will quickly become unusable.

Therefore, an important requirement for a chimney is its corrosion resistance. Such a material is acid-resistant stainless steel, which ensures the durability of the stack.

- 4 The surface of the chimney walls also has a big effect on the drag, because the smoother they are, the lower the drag coefficient and the stronger the drag. In addition, the roughness of the walls contributes to soot accumulation, which leads to a reduction in the cross-sectional area of the flue and, as a result, to a reduction in draft. Smooth surfaces of stainless chimneys have a minimum drag coefficient and stainless steel prevents soot from sticking to them.

The chimney of the heater must therefore provide good draught and be strong and durable. It must be able to withstand high flue gas temperatures (when the stove is fired), ensure stable smoke production (in economy mode) at low flue gas temperatures, withstand the effects of condensate and aggressive acids, be fire-resistant and easy to install.

We therefore recommend the use of DIN 1.4571/1.4404 heat-resistant acid-resistant stainless steel chimneys.

This type of chimney is thin, heats up very quickly, has a mirror-like surface to which nothing sticks and is not damaged by exposure to aggressive acidic condensate. The use of this type of chimney ensures high efficiency, reliability and durability and, as a result, the correct and efficient operation of the stove in the modes and with the characteristics for which it is intended.

There should be a separate chimney pipe for each stove, or a separate duct in the brick chimney (provided it has a mandatory lining of stainless inserts).

The chimney diameter shall be at least equal to the diameter shown in Table 1 throughout the height of the chimney.

The height of the chimney from the outlet of the stove to the top of the stove shall not be less than the height shown in Table 1 and shall always be above the roof ridge.



NOTE! When assembling non-insulated metal (stainless) chimney flues, insert the upper pipe into the lower pipe (Fig. 4).

When installing insulated pipes, the upper inner pipe is inserted into the lower pipe, but the upper outer pipe is inserted on top of the lower pipe.

Pipes with asbestos cement are not allowed to be used as chimneys.

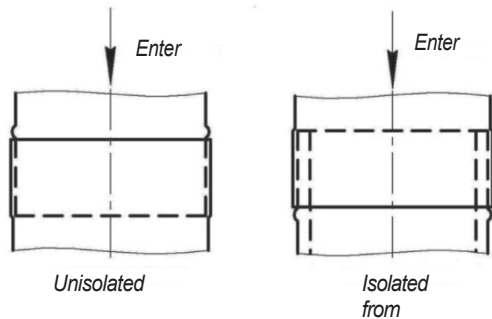


Figure 4. Connecting the chimney pipes

When installing the chimney (Figure 5, 6, 7), the following requirements must be followed.

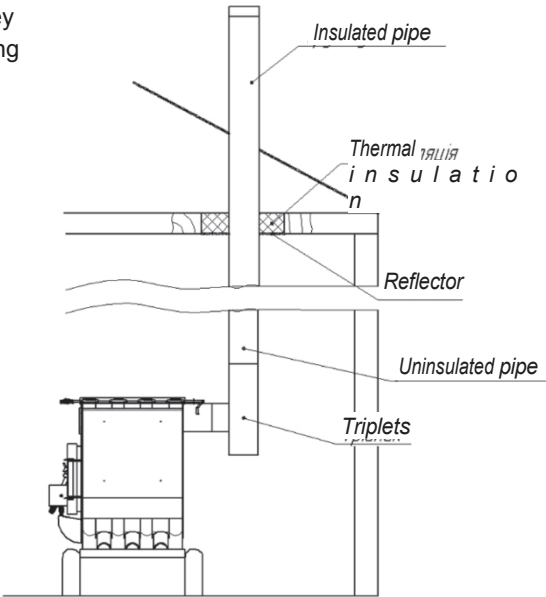


Figure 5.
Chimney installation
through the ceiling

Metallic pipes installed under the ceiling or parallel to walls and partitions made of materials of reaction to fire groups G3 and G4 should be spaced at the following distances: at least 0,7 m - uninsulated pipe; at least 0,25 m - insulated pipe which does not allow its external surface temperature to exceed 90 °C.

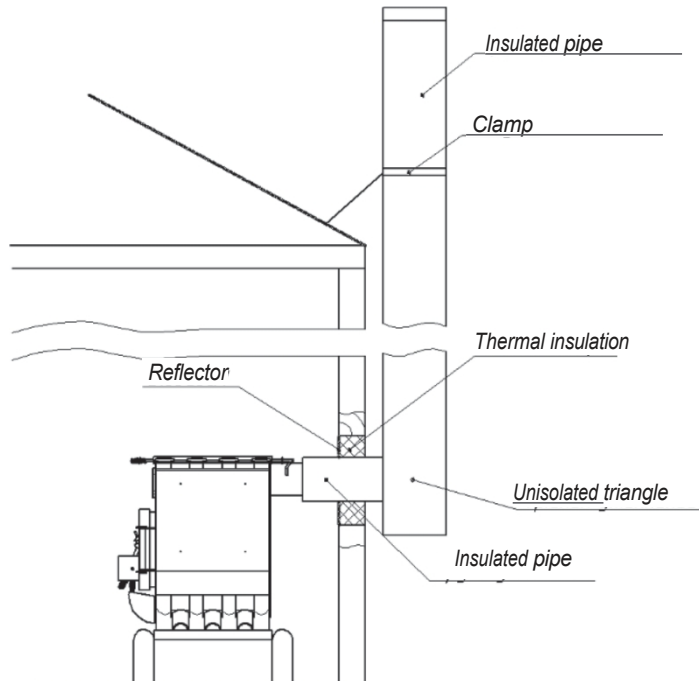


Figure 6. Chimney installation through the wall

Metal chimneys may be installed through a ceiling made of combustible materials, provided that at least 0.51 m of non-combustible material is installed.

If the chimney pipe is routed through a window, at least a steel sheet with a diameter of three times the chimney pipe must be installed in the window.

The end of the pipe must be directed away from the wall of the building by at least 0,7 m and shall terminate with an upward pointing end at least 0,5 m above the ground. The chimney cap leading from the upper deck window shall extend 1 m above the eaves. Chimneys shall be constructed vertically. A vertical deflection of up to 30° is permitted, with a maximum

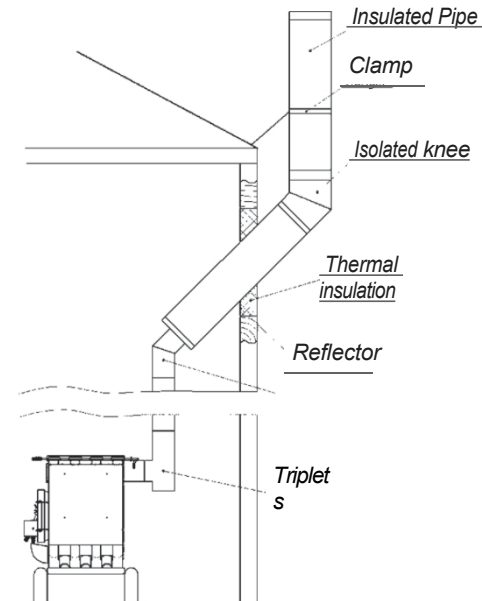


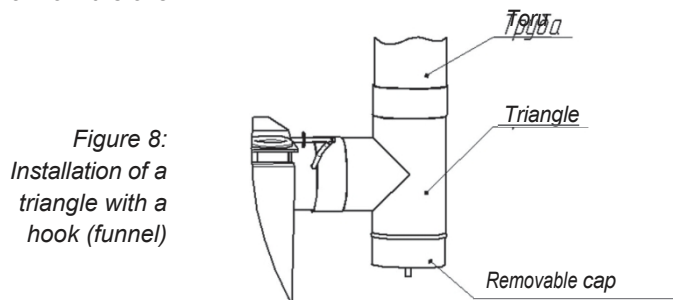
Figure 7: Installing the chimney through the wall, using the elbow

It is recommended to install a chimney cap at the end of the chimney to drain off rain. Chimneys in buildings with roofs made of combustible materials shall be equipped with metal mesh spark arresters with openings no larger than 5 x 5 mm.

Horizontal sections are not recommended for chimney installation. As an exception, one horizontal section extending directly from the stove up to 1 m in length is allowed.

In order to prevent soot and condensate from clogging the chimney and to facilitate chimney cleaning, the following must be installed.

T-shaped triangle (Figure 8) with removable cap (funnel) immediately after removal from the oven.



*Figure 8:
Installation of a
triangle with a
hook (funnel)*

The space between the chimney stack pipes and the roof structure of combustible or refractory material shall be covered with non-combustible roofing material.

If the chimney passes through the roof, a lead-through is made according to SNiP 2.04.05 - 91. The hole and the chimney are then covered with metal (through the roof), which is placed under the roof tile (slab) on one side and on the other side on the roof tile.

Place the cap (chimney cap) on the end of the chimney, seal it with a silicone gasket and secure it with a screw (Figure 9).

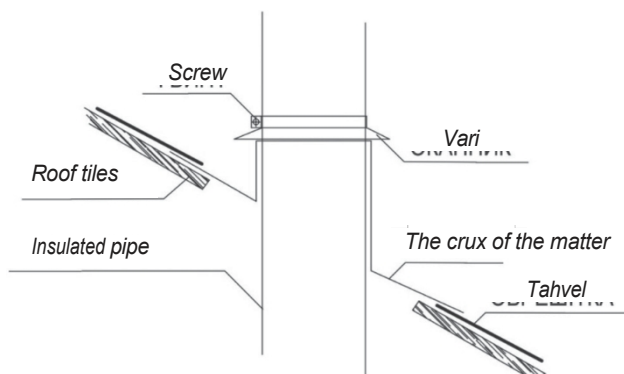


Figure 9. Chimney penetration through the roof

This ensures rain protection for the roof and attic.

The height of the chimney pipe projecting from the roof must be taken into account:

- at least 500 mm - above the flat roof;
- not less than 500 mm - above the ridge or parapet, if the pipe is not more than 1,5 m from the ridge or parapet;
- no lower than the eaves or parapet - if the chimney is 1,5-3,0 m from the eaves or parapet;
- not lower than a line drawn at an angle downwards from the brush. 10° from the horizontal if the chimney is more than 3,0 m from the ridge (Figure 10).

Chimneys must be located above the roofs of taller buildings connected to the house.

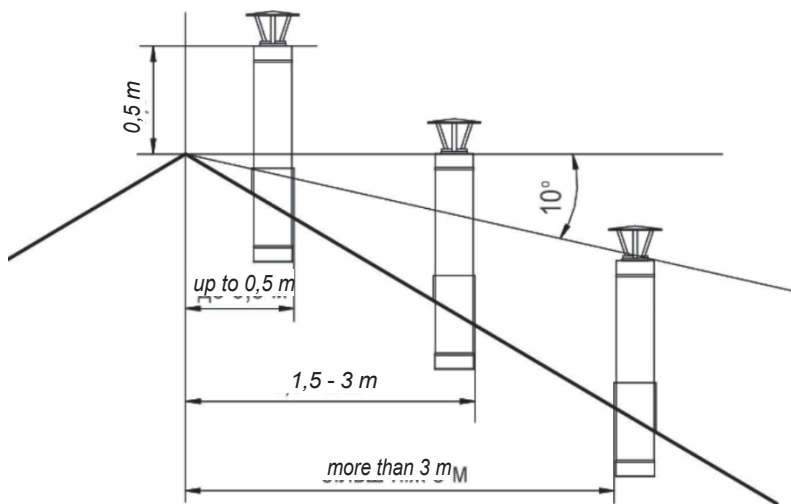


Figure 10. Positioning the chimney above the roof

7

FUEL USED IN THE STOVE

The stove works with all types of solid fuels: wood, wood waste, wood and peat briquettes, pellets, paper, cardboard, etc.

The standard fuel choice is wood chips that have been dried naturally under shelter for 1-2 years to a moisture content of up to 20%. Optionally, large round stacks as long as the stove can be used without splitting.

If sawdust is used, it should be used in combination with firewood. Never use liquids or gases, coal, coke, etc. as fuel. Also, do not burn plastic, plastics, rubber, etc. as this will cause the release of toxic gases as well as environmental pollution.

The fuel must be stored in specially adapted rooms or in specially designated places, in accordance with building regulations. It is strictly forbidden to: convert the stove to burn other types of fuel, or make any changes to the stove's construction.

8 USE

NOTE! The stove is painted with a heat-resistant enamel containing silicone, which is only fully polymerised during the first heating of the stove, with a strong odour that disappears afterwards.

Therefore, the first heating of the stove should be carried out in a well-ventilated room with the doors and windows fully open or outside the room. Before using the stove, make sure that all stove and chimney components are working properly. The stove and chimney must be inspected and cleaned at least once every two months.

It must also be systematically cleaned of dust and other foreign matter, together with the room's fresh air intake duct.

Before firing the oven, set the throttle slide and power slide to the fully open position (Figure 11).

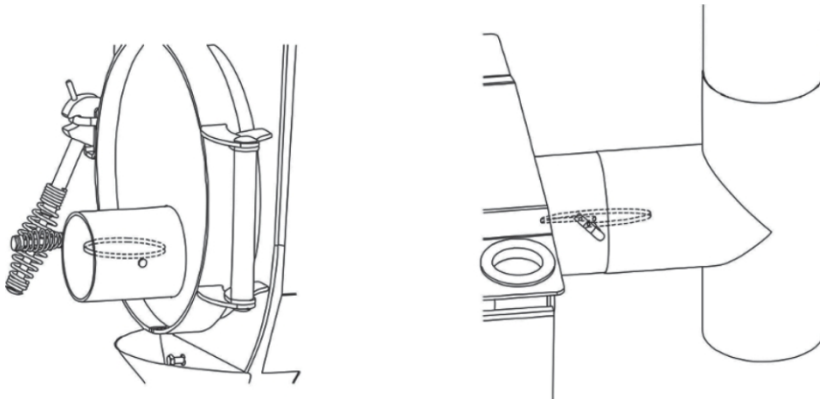


Figure 11: Position of the sliding rails when lighting or inserting firewood (intensive mode)

Use paper and wood chips to light it, and when it lights, add fuel to the firebox until it is completely full.

Within 2-3 minutes after the fuel has properly ignited, close the oven door and the power regulator damper, and only then close the regulator damper - gas valve. In this way you reconfigure the oven for gasification mode (Figure 12).

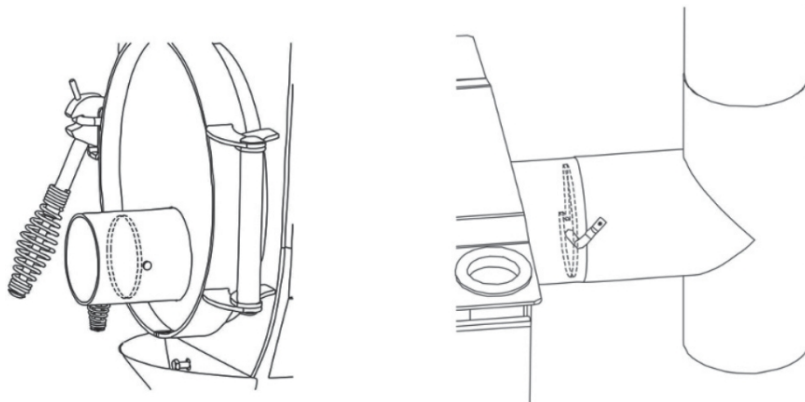


Figure 12. Position of the sliders in the main (economic) mode

When the power and throttling dampers are fully closed, the efficiency and running time of the oven is at its maximum.

Determine the appropriate combustion intensity by changing the position of both wings. Their position will be determined by experience and will depend on the quality of the firewood (density, moisture content), chimney construction (height, number of knees), weather conditions (pressure, wind), etc.

NOTE! Intense combustion mode is not the main mode of operation of the oven and cannot be recommended for permanent use, as it will reduce the life of the product drastically and the safety of the heat-resistant cover is not guaranteed.

Before adding fuel, switch the oven on to the intensive combustion mode, first open the damper fully (i.e. open the flue gas outlet), then after 2-3 minutes smoothly open the power damper (i.e. increase the air supply for combustion) and only then open the oven door. Add fuel, close the door and set the dampers to the previous position.

Allow the fuel to burn out completely and the ash to cool before removing the ash. Do not remove the ash completely. Always leave a layer of ash up to a maximum of 50 mm high (around the bottom edge of the door). The ash layer is necessary to protect the lower pipes from combustion and also acts as a thermal insulation in the lower pipes to create

No stove is allowed during operation:

- leaving the stove unattended or entrusting its maintenance to young children;
- place fuel and other combustible substances and materials directly in front of the oven opening;
- store unquenched coals and ashes in metal containers placed on a wooden floor or a combustible surface;
- drying and stacking clothes, firewood, other combustible objects and materials on the stove;
- use firewood of a length greater than the size of the stove;
- heat the oven with the door open;
- use ventilation and gas ducts as chimneys;
- place the chimney of the stove on a burning surface;
- mount aerials for TVs, radios, etc. on chimneys;
- keep a fuel reserve in the room that exceeds daily needs.

9

TRANSPORT AND STORAGE

The oven may be transported by any mode of transport, in accordance with the rules applicable to this type of transport.

Conditions of transport of the furnace according to climatic conditions - according to the group 8 of storage conditions, according to the conditions of GOST 15150 - 69 and mechanical factors C, and according to the requirements of GOST 23170 - 78.

The oven must be stored in a warehouse.

Oven storage conditions according to the effects of environmental climatic factors in Part 4, in accordance with the requirements of GOST 15150 - 69.

10 **MANUFACTURER'S GUARANTEES**

The manufacturer guarantees the quality of the oven in accordance with the requirements of TU U 27.5-23764970- 026:2022, provided that the consumer complies with the conditions for transport, storage, installation and use specified therein and in this manual.

The guarantee is valid for 12 months.

When buying a stove, the buyer checks that it is complete.

The warranty does not cover minor defects such as damage to the paintwork, loose sealing gaps and other defects that may occur due to overheating of the oven and can be remedied by simple local measures.

Failures. External manifestations	Reasons	Removal methods
The oven does not boil, does not leak, does not drag	<p>The stack height is insufficient.</p> <p>Lack of thermal insulation on the outer parts of the stack.</p> <p>The chimney is clogged with soot and ash. Vertical deflection of the pipes up to 300, moving more than 1 m away.</p> <p>Asbestos pipes have been used as chimneys. The chimney is connected to a brick wall.</p>	<p>Install the chimney according to tab 1, point 3.</p> <p>Insulate parts of the stack that are outside the room.</p> <p>Clean the chimney.</p> <p>Modify the stack design.</p> <p>See paragraph 6.</p> <p>See paragraph 6.</p>
Smokes badly, leaks	<p>Not enough air for combustion, tightly closed windows and doors.</p> <p>The chimney was clogged with soot and ash.</p>	<p>Open a window. Ventilate the room, see point 8.</p> <p>Clean the chimney.</p>
Pink spots appearing on chimneys	<p>Condensate formation due to flue gas temperature:</p> <ul style="list-style-type: none"> • absorption of cold air; • the use of wet or damp firewood; • uninsulated chimney. 	<p>Prevent air from being sucked in through the cleaning door and seal the chimney leaks.</p> <p>Insulate parts of the stack that are outside the room.</p> <p>Use only dry wood chips.</p>
Insufficient temperature during operation of the oven	Use of wet firewood.	Use only dry wood chips.
Smoke escapes from convection tubes	<p>Chimney fault.</p> <p>The stack height is insufficient.</p> <p>Lack of thermal insulation on the outer parts of the stack. Vertical deflection of the pipes up to 300, moving away from the more than 1 m.</p> <p>Use asbestos pipes as chimneys.</p> <p>The chimney is connected to a brick wall.</p> <p>The chimney is clogged with soot.</p>	<p>Install the chimney according to tab 1, point 3.</p> <p>Insulate parts of the stack that are outside the room.</p> <p>Modify the stack design.</p> <p>See point 6.</p> <p>See point 6.</p> <p>Clean the chimney.</p>
Smoke comes out when the oven door is opened	The oven has not been cleaned. No draft.	<p>See section 8.</p> <p>Clean the chimney.</p>
Smoke comes out air capacity from the air power limit switch	<p>Chimney insulation failure.</p> <p>Not enough air for combustion, tightly closed windows and doors.</p>	<p>Insulate parts of the stack that are outside the room.</p> <p>Open the window, ventilate the room.</p>