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KALVIS[®]



**KITCHEN CENTRAL HEATING
SOLID FUEL BOILER**

KALVIS - 4



**TECHNICAL SPECIFICATION,
INSTALLATION AND SERVICE MANUAL**



LST EN 13240:2002

ГОСТ 9817-95

ГОСТ 20548-93

Made in Lithuania

Dear buyer,

Thank you for choosing our **KALVIS** product.

Please read thoroughly this user manual and pay especial attention at the safety points in the starting pages.

We advise you to preserve e this manual in order to use it in the future or to pass it on to other users.

Transportation damages

After unpacking, check the boiler for transportation damages. If in doubt, do not use the boiler and contact the seller.

Used symbols mean:



Important information or helpful tips for installing or using this product.



Warnings on your health or property safety and correct functioning of the product.



Warnings on fire danger.



Warnings on a potential explosion hazard.



Warnings on hot surfaces.



Tips and information on the cost-effective and eco-friendly use of the product.



This user manual was compiled following the requirements provided for in LST EN 12171 Heating systems in buildings - Procedure for the preparation of documents for operation, maintenance and use - Heating systems not requiring a trained operator.

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1. Purpose

Kitchen central heating solid fuel boiler **Kalvis-4** (*the boiler*), is an interrupted combustion unit. It is mainly used to heat living premises where central heating system is installed with forced circulation and with open or closed expansion system.

Additionally, boiler can be used for food cooking.

2. Safety precautions



Boiler can be operated by adults, well-familiar with its design and this technical specification.



In the case of fire in the premises or in the chimney, close air supply to the boiler and call fire rescue service (**tel. 112**). If possible, remove burning fuel and ember from combustion chamber into a sealed or water-filled container (keep away from water steam and wear protective gloves).



It is prohibited:

- To arbitrarily change the design of the boiler.
- To use a common ventilation system for the boiler flue outlet!
- To ignite boiler with flammable liquids (petrol, kerosene, etc.).
- To dry fuel and other easily ignitable items near or on the boiler.
- To leave alone or entrust with boiler care: children, the disabled and untrained persons.
- To open or leave open the boiler door during the boiler stoking.
- To start the boiler without filling the heating system with water (water in the heating system and the boiler must not freeze).
- To connect the boiler to a closed system without a safety valve that prevents the system from exceeding the pressure by more than 1.5 bar (0.15 MPa).
- When operating the boiler, to close the feed and return line valves.
- To dispose still burning ashes near residential and commercial buildings.



It is prohibited to stoke the boiler with:

- fine wood waste (dust), this causes explosion risk or spark discharge from chimney;
- waste (household waste);
- furniture waste.



It is prohibited to overheat (boil) water in the boiler!

3. General remarks

-  Since boiler design is constantly improved, inessential deviations from this manual can occur.
-  During boiler installation, observe all building standards and fire protection requirements.
-  Armrest is not a part of boiler body, so don't use it to lift or move the boiler.
-  Boiler installation, adjustment and operator training can be entrusted only to the certified firm which has specialists able to carry out installation works or manufacturer-authorized representative. Installed and connected boiler has to be checked by fire safety personnel.
-  Boiler can be installed into the system which **maintains no less than 60 °C return water temperature. In the case of failure to observe this requirement, condensate-related corrosion will significantly shorten the boiler body service life.**
-  It is strictly forbidden to start the boiler without having filled it with technical water.
-  After starting the boiler for the first time, when its body heats up and paint finally cures, volatile substances with unpleasant smell are released, so adequate ventilation of the premises is necessary.
-  Use the fuel which has no more than 25 per cent of moisture. **With higher fuel moisture, boiler power decreases and fuel consumption increases.**
-  In the case of too strong chimney draft, or if using sawdust, shavings, chaff or other bulk materials, during fuel loading or after burn out and shaking the remaining fuel, sparks can escape from the chimney.
It is strictly forbidden to use mentioned types of fuel if roofing or building constructions are made of easily combustible materials, or there are building materials or fuel stored at a distance less than 20 m away from the chimney!
-  Boiler operates at optimum when it reaches power close to nominal.
In the cases when less heat is needed than the boiler's nominal power, don't load combustion chamber at full for there was no constant smoldering of the loaded fuel (resins can start accumulating in the boiler). It is advisable to load only one third of the chamber.
-  It is strictly forbidden to pour water over the burning fuel in the combustion chamber. This can irreversibly damage the boiler.

4. Product description

4.1. Technical information

Table 1

Boiler model			Kalvis - 4
Nominal power *1 (bottom firegrate / top firegrate *2)		kW	18 / 16
Release to heating system (bottom firegrate / top firegrate *2)		kW	15 / 13
Release to premises (bottom firegrate / top firegrate *2)		kW	3 / 3
Heated area (energy efficiency according to STR 2.01.02:2016)	B class buildings *3	m ²	155 ... 378
	C class buildings *3		83 ... 198
Fuel used			firewood *4
Fuel moisture		%	25
Efficiency factor, when stoking with firewood		%	76
Combustion chamber volume (bottom firegrate / top firegrate *2)		dm ³ (l)	70 / 40
Fuel load weight, up to *1 (bottom firegrate / top firegrate *2)		kg	18 / 9
Fuel load burning duration, up to *5 (bottom firegrate / top firegrate *2)		val.	3 / 1,5
Recommended size of firewood (length when loading along chamber), up to,		cm	35 x Ø10
Fuel loading hole dimensions, no less than, height x width		mm	230 x 290
Escaping flue temperature, no more than		°C	230
Operating water pressure in the boiler	no less than	bar (MPa)	0,3 (0,03)
	no more than		1,5 (0,15)
Hydraulic test pressure		bar (MPa)	4 (0,4)
Water volume in the boiler		l	55
Max allowed water temperature	in closed heating system	°C	90
	in open heating system *6	°C	70
Min boiler return water temperature during operation		°C	60
Recommended boiler return water temperature during operation		°C	70 ... 90
Connection branch pipe diameter		mm	G1½B
Release branch pipe diameter		mm	-
Min distance to combustible materials		mm	380
CO release volume		%	1
Operation environment temperature		°C	3 ... 40
Boiler flue pipe dimensions – relative diameter		mm	Ø 160
Chimney draught	no less than	Pa	14
	no more than		17
Exhaust flue temperature at nominal power, up to		°C	230
Exhaust gas volume at nominal power		kg/s	0,018
Overall dimensions, no more than (net/gross):	height	mm	910 / 1055
	width	mm	550 / 800
	length	mm	1100 / 1200
Weight (net/gross) no more than		kg	195 / 205

*1 If stoking with 18-20 % moisture birch firewood. It is not recommended to use firewood with moisture over 25 %.

*2 When stoking the boiler, firegrate can be put in the bottom or top position.

*3 According to STR 2.01.02:2016 Design and certification of energy performance of buildings requirements calculated energy volume, expressed for building energy performance classes B an d C.

*4 The use of wood chips, sawdust briquettes can be used as a spare fuel.

*5 The burning time of the fuel load depends on the type of fuel, humidity, outdoor temperature and other factors.

*6 It is not recommended to install a boiler with an accumulator tank in an open heating system. Intensive boiler firing at an ambient temperature close to 70 °C will cause water to boil in the boiler, resulting in extraneous sounds.

4.2. Design

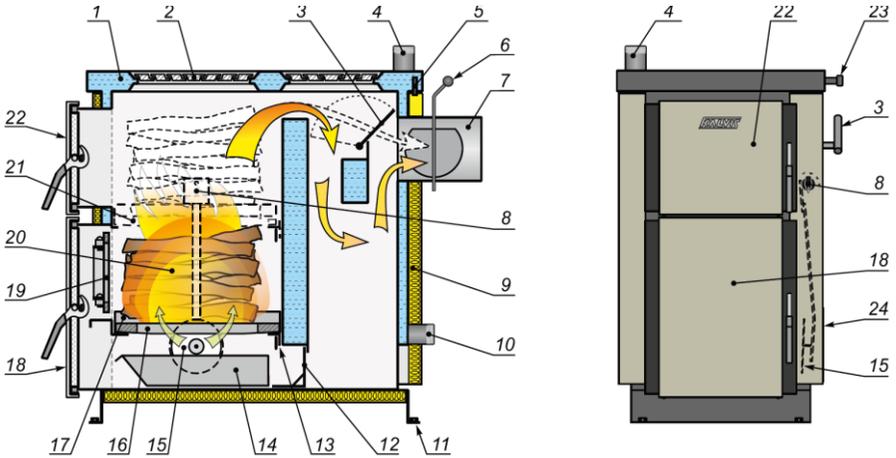


Fig. 1. Boiler design.

1. Frame. 2. Cast iron rings. 3. Firing valve. 4. Outgoing (hot) water branch pipe. 5. Air draft controller sensor. 6. Smoke draft valve. 7. Flue pipe. 8. Air draft controller. 9. Decorative - thermal insulating panels. 10. A return (cooled) water branch pipe, also used as a discharge branch. 11. Welded nuts for mounting the boiler to the pallet and height adjustment during installation. 12. Inserted cleaning cover. 13. Hung firegrate holding bracket. 14. Ash drawer. 15. Air supply valve. 16. Firegrate. 17. Side supports for firegrate. 18. Combustion chamber door. 19. Inner cast iron door. 20. Combustion chamber. 21. Upper position of firegrate. 22. Charging door. 23. Handrail. 24. Air supply grate.



For your convenience, in order to make the most efficient use of the premises where the boiler is to be installed, select the most suitable boiler model (see fig. 2).

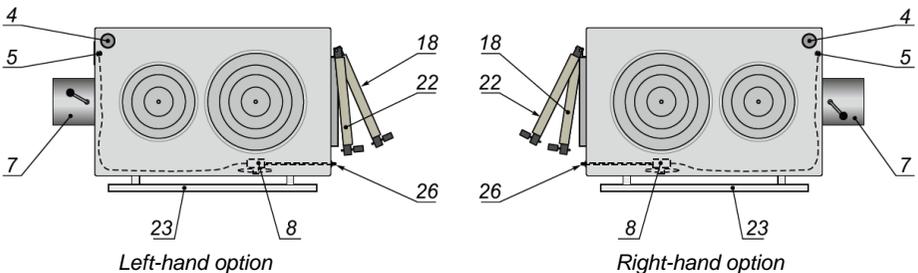


Fig. 2.

4. Outgoing (hot) water branch pipe. 5. Air draft controller sensor. 7. Flue pipe. 8. Air draft controller. 18. Combustion chamber door. 22. Loading door. 23. Handrail. 26. Air supply valve adjustment handle.

5. Boiler installation



Boiler is to be installed in the kitchen or other sufficiently ventilated room, meeting the requirements set for such premises in the country of its installation.

Before connecting the boiler to the heating system and the chimney, it is necessary to evaluate that during operation it will be necessary to service (clean, adjust, etc.).

The boiler must be positioned vertically or tilted forward not more than by 1°. The floors of the premises must be even, non-flammable, capable of withstanding up to 0.4 t/m² of load.

The height of the boiler installation (horizontality) can be adjusted with the bolts used to secure the boiler to transport pallet.

Dimensions of the boiler are given in figure 3, and for fire safety minimum distances to walls and ceilings are given in section 5.1.

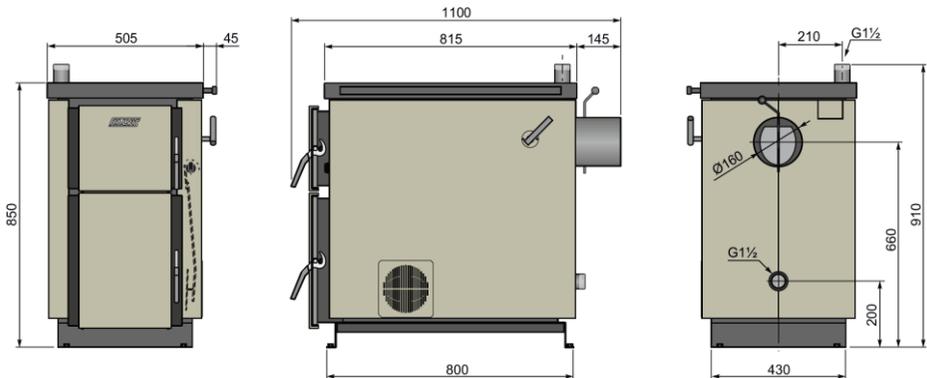


Fig 3. Overall boiler installation dimensions.

5.1. Fire safety precautions



- If boiler is installed on the floor which may catch fire, lay on the floor underneath the boiler a sheet of tin at least 1 mm thick.
- Distance between boiler door to edge of the tin is 0,5 m, distance from boiler side to edge of the tin is 0,3 m.
- Distance from boiler door to combustible wall shall be no less than 1,25 m, from boiler side 0,38 m; from hot-plate no less than 1,0 m.
- Chimney, flue and ventilation channels must be in line with building standards and regulations.
- If boiler is connected to chimney with the means of metal pipes, they have to be mechanically durable and coated with heat insulation material.

5.2. Requirements for chimney

Chimney design and boiler connection to chimney options are shown on *fig. 4*.

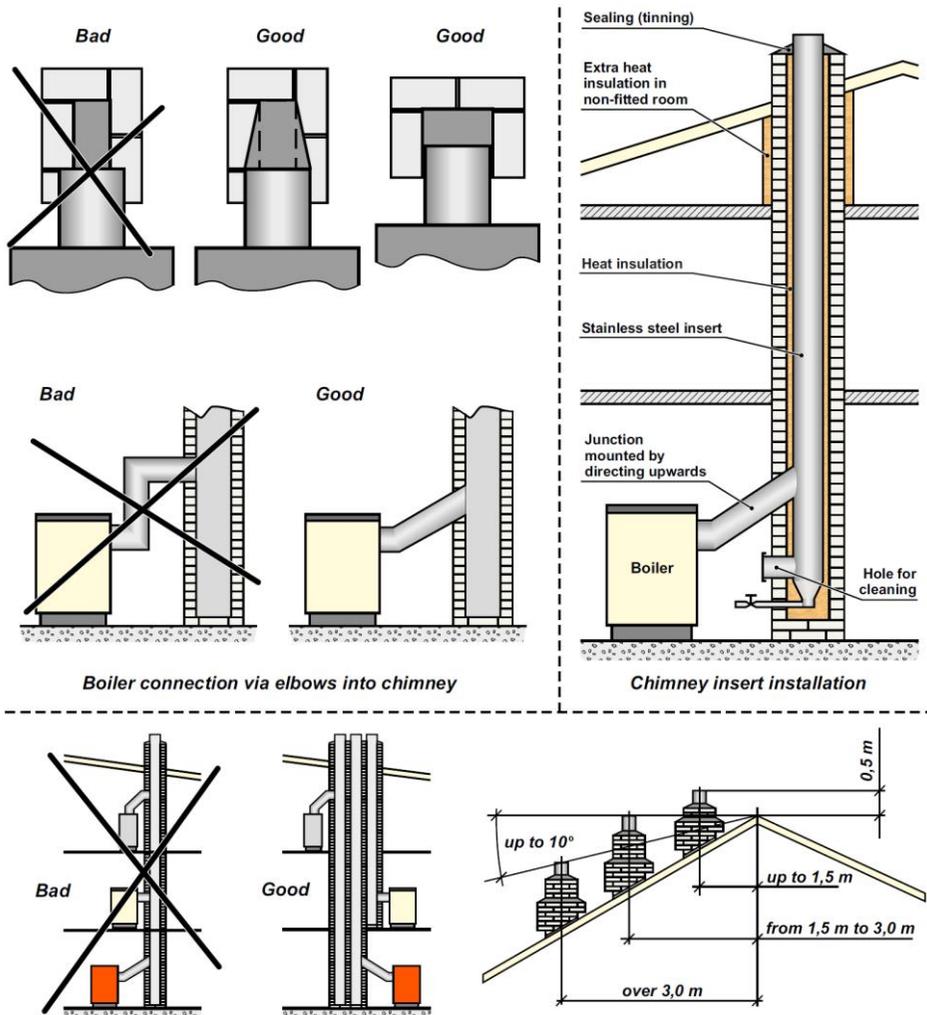


Fig. 4.

Requirements:

- Boiler needs a separate chimney hole without any other extra connections.
- Chimney draft has to be as shown in the main technical specification table.
- Chimney hole must have diameter no less than that of the flue pipe outgoing from the boiler.

- If chimney is connected via extra elbow, it must have diameter no less than that of the flue pipe outgoing from the boiler with bending radii no less than 100 mm. If it is not additionally insulated with heat-proof material, it has to be at a distance from flammable constructions no less than 1,5 m from above and 0,5 m from other sides.
- Seal gaps well at the junction and inlet to the chimney.
- In the chimney junction, in the convenient location, install holes for periodic (monthly) soot removal.
- Stainless steel insert is advisable to install in the chimney. In order to do this qualitatively, we recommend that you contact a company with experience in this field. The well-placed insert protects the chimney from the effects of condensation and improves draft. The insert does not significantly reduce the cross-section of the chimney opening.
- Parts of the insert have to be tightly interconnected (not soldered);
- Install condensate collector in the bottom;
- Fill in the gap between the chimney walls and the insert, at least in the outer part of the chimney, with non-flammable heat insulation material. On the top, seal the gap with plaster and tin with a slope (from the hole down to chimney edge);
- Inside a cold attic, insulate the chimney with non-combustible heat insulation material.

Always remember that:

- The smoke coming from the boiler via flue pipe to the chimney continues to cool, the vapours in the smoke condense by setting on the walls of the chimney, especially in the unheated attic and in the outer part of the chimney;
- Condensate acids and heat-cold erosion over a few years can destroy the chimney;
- Remaining unremoved soot in the chimney can ignite over time and can be a source of fire in the case of an irregular chimney or a flammable roof.

Recommendations:

- Chimney is a very important part of the heating system, so its installation and boiler connection works can be entrusted only to certified firms experienced in these kinds of operation.
- If it is impossible to erect chimney of required height and reach the required draft, install the exhauster. The best suited are exhausters mounted on the chimney. Of course, other options are available, they are to be suggested by experts.
- In order to ensure stabile (even) boiler combustion, we recommend to use draft stabilizer, e.g. WZB-1, (see fig. 5) or similar models.



*Fig. 5.
Draft stabilizer
WZB-1*



- It is recommended to have the chimney inspected annually by a qualified fire-care expert.

5.3. Connection to the heating system

Requirements for connection (see fig. 6a, 6b):

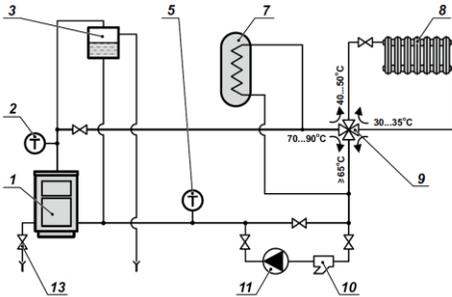


Fig. 6a

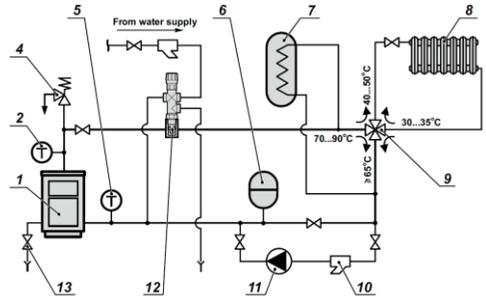


Fig. 6b

Recommended connection design options:

Fig. 6a: open type heating system; fig. 6b: closed type heating system.

1. Boiler.
2. Thermomanometer *.
3. Open expansion vessel.
4. Protective valve.
5. Thermometer.
6. Expansion vessel.
7. Boiler.
8. Coils
9. Quadruple mixing valve.
10. Water filter.
11. Pump.
12. Emergency cooling valve.
13. Filling-discharge pipe.

* Boiler is completed with thermomanometer, with accurateness and response time in line with its measuring functions.

Requirements for connection:

- The boiler must be connected to the heating system according to a project prepared by the heat engineering technicians or the work can be carried out independently by a highly skilled plumber, experienced in the work and well-familiar with this description.
- Connect the boiler to heating and return pipes with a diameter of at least 1½ in.
- When connecting the boiler to an enclosed heating system with a membrane expansion vessel, its permissible pressure can be up to 10 bar, the air pressure must be equal to the pressure in the system, e.g. 0.6 bar. An open-ended expansion tank can be fitted in place of the membrane expansion vessel when developing an open-type heating system.
- A safety valve (G½B) must be fitted into the system as close to the boiler as possible, protecting the boiler housing from pressures greater than 1.5 bar (0.15 MPa). There must be no closing valves between the boiler and the safety valve.
- **If the system has valves disconnecting the boiler from heating system installed, they must be fully open. On order to avoid a mishap, after opening the valves, remove their handles to safe place.**



- In order to avoid condensate formation in the boiler which can drastically shorten the boiler's life, install the heating system maintaining no less than 60 °C return water temperature.
- Emergency cooling valve is used to protect the boiler from overheating. When boiler temperature is close to the dangerous limit, the valve opens and discharges hot water into sewage at the same time refilling the heating system with cold tap water. When temperature in the boiler becomes non-hazardous, valve closes and heating system operates as usual. Technical specifications of the emergency cooling valve:
 - opening temperature: 97 °C (+/-2) °C;
 - maximum permissible temperature: 120 °C;
 - maximum pressure in the heating system: 4 bar;
 - maximum pressure in the water supply system: 6 bar;
 - water flow at 1 bar pressure difference: 1,8 m³/h, at 110 °C.



Install the emergency cooling valve as close to the branch pipe of outflowing water from the boiler as possible.



In the open type heating system, install the pump on the return water pipe.



- Install in the system the water discharge pipe to discharge water from the system in the case of system freezing risk or during boiler repairs;



- ***During installation, weld onto the outflowing water pipe, in the well-visible place, a coupling with G½B thread, used to connect the completed thermomanometer.***



- Fill the boiler with desalinated, soft or at least rain water. If using prepared "soft" water in the system, the boiler body will serve longer.



- *It is recommended to have the boiler inspected annually by a qualified boiler maintenance expert.*

6. Boiler operation



*Hot-plate with rings; door external surface; flue pipe and other surfaces of the boiler not covered with thermal insulation panels **during operation get hot dangerously – don't touch them.***

Recommended fuel moisture is no more than 25 %.



When stoking a boiler with a damp fuel (wood or sawdust), condensation combines with combustion products resulting in acids, which shorten the life of the boiler for several times.



When stoking with damp fuel, the specified performance efficiency cannot be reached so much more firewood is consumed.



*User at his own discretion can use other solid fuel, **without making claims to the manufacturer for poor performance.***



In order to avoid smoke getting into the room, combustion chamber door and loading door has to be closed, except the cases when the boiler is started or refuelled. Boiling holes have to be covered with rims or the heated vessel.



***Never use** mechanical exhausters in the room where boiler is operated. Only natural draft system can be used there.*



During boiler operation, large air volume has to be supplied to the room for combustion support, so it is strongly prohibited to close incoming air holes with grilles or valves.



If in the room with operating boiler there are more air-consuming units, air supply to the room has to be sufficient for all the units.



Don't cover or put anything on air supply valve grate.



When boiler is fired, put pots or other kitchenware on boiling holes covered with rims or instead of the rims. This will help to avoid damage to the boiler body top part paint layer.

6.1. System preparation for heating



Before firing the boiler make sure that:

- The system is fully filled with technical water and deaerated;
- Valves disconnecting the boiler from system are open;
- Heating system circulation pumps are operating;
- Protective valve is operating (check by turning).

6.2. Boiler ignition



Before firing the boiler, check the following:

- After installation of the boiler and after each cleaning, make sure that the cleaning lid is tightly set.
- Check chimney for clogging after longer periods of non-use;
- Check rings covering the heat-plate holes for correct fitting.
- Check hinges for easy opening-closing.
- Check the doors for closing tightness, if not, correct or replace sealing ropes.

Combustion and draft efficiency depends on all this.

Before firing the boiler, fully open smoke draft and firing valves. Add chopped fuel on firegrate in the combustion chamber through the combustion chamber door and internal cast iron door.

When combustion is good, refill the combustion chamber with more coarse fuel (*how to refill see below: "Combustion chamber refuelling"*).

Close the door, adjust the combustion intensity with the air draft controller.

The chimney draft can be lowered by smoke draft valve.

In the case of poor draft, in bad weather conditions, it is recommended to open the smoke draft valve completely when the boiler is started, and after the chimney warms up and draft improves, to close the valve.

Finer split firewood burns more efficiently and boosts boiler power.

If coal is fired, take 5 - 10 kg of firewood and add 10 cm of coal. Add coal by layers several times, depending on the quality of the fuel and the amount of heat you want.



After starting the boiler for the first time, when its body heats up and paint finally cures, volatile substances with unpleasant smell are released, so adequate ventilation of the premises is necessary



In the beginning of boiler operation, when firewood burns, condensate sets on the inner walls, when they are still free of soot layer, giving an impression that the boiler is leaking. Condensate disappears (when return water reaches 60 °C) after 1 – 2 hours of stoking, depending on stoking intensity and moisture of the fuel used. In order to make sure that boiler is sealed, fire it for 1 – 2 hours intensively with dry firewood, then stop firing and look for condensate volume. If it stops growing, the boiler is sealed.

6.3. Air draft regulator control

Automatic air supply adjustment valve is installed in the boiler. After the boiler reaches the desired temperature (according to regulator handle positions, see fig. 7), air supply hole closes automatically and combustion intensity decreases.

After the boiler reaches the desired operation temperature ($70 \div 90$ °C, compared to thermometer readings), set desired temperature with the help of air adjustment handle.

Desired boiler temperature is in line with the air supply valve positions shown in fig. 7.

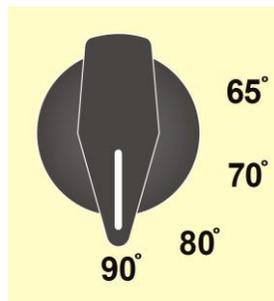


Fig. 7. Air draft regulator handle.



There is possible mismatch between regulator handle position and thermomanometer readings.



Air draft regulator sensor is installed in the rear part of the boiler, near the outflowing water branch pipe, covered with easily removable lid. Before connecting the boiler, check the lid for correct positioning (see fig. 8).



Before operating the boiler, make sure that the air draft regulator operates correctly. With the means of the regulator set the desired temperature; during combustion process in the boiler (if heating system is setup correctly) temperature can't rise by no more than 10 °C of set temperature (temperature should be checked on thermometer, which should be installed on outgoing water pipe (2, see 6a, 6b pics)). Air draft regulator could be checked and adjusted as below:

- *Take off air supply grate (24) (see 1 and 9 pics)*
- *Heat the boiler up to 80 °C*
- *Set the air draft regulator (8) position to „80°“ (see pic 7)*
- *Air supply valve should close. If valve did not close completely, then must turn it until there is no gap between valve and boiler's frame (see pic 9).*
- *Fix air supply valve (11) with a nut (see pic 9).*
- *While rotating handle (see pic 7) to the position „90°“ (outer water temperature from the boiler should be 80 °C), air supply valve must be opened.*
- *When boiler's temperature reach 90 °C (outer water temperature is 90 °C), air supply valve must close.*

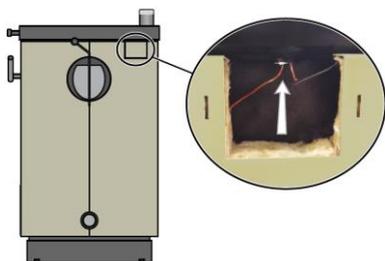


Fig. 8. Air draft regulator sensor.

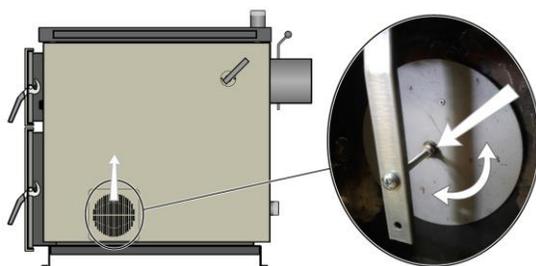


Fig. 9. Correction of air draft regulator valve.

6.4. Combustion chamber refuelling

i It is advisable to refuel only after previous fuel load fully burns out; earlier refuelling is allowed only in the cases of necessity when there is no other option.

i Put firewood freely into the combustion chamber, for while burning the pieces could slump down to the bottom of the combustion chamber.

When refuelling:

- Fully open smoke draft and firing valves;
- Turn the draft regulator knob (clockwise, up to the support) to fully close the air supply valve;
- Open the fuel loading door and wait for 15 to 20 s after opening the door (check the open door until no smoke remains in the chamber);
- Open the door fully, if necessary, moving the lower layer of the fuel with poker so that the ash does not clog the openings in the firegrate to allow air to pass into the combustion chamber;
- Refuel the combustion chamber;
- Close tightly the fuel loading door and close the firing valve;
- Restore the smoke draft valve trap to its former position for the required draft from the boiler;
- Open the air supply valve with the help of air draft controller according to the selected temperature.

6.5. Boiler stoking

In the case of poor drafts, bad weather conditions, open the firing valve and close it when the chimney warms up and draft improves.

i Boiler performance factor drops if stoking the fuel with smoke draft valve open.

i In the case less heat is needed than the nominal power of the boiler, for there was no smoldering (in which case resins can start accumulating in the boiler), do not load the combustion chamber in full. It is advisable to load one third of the combustion chamber.

If boiler is used for cooking only, move the firegrate to the top position. Then stoking goes on through the upper fuel loading door.

In fuel combustion, ashes remain which cover the firegrate; the intensity of combustion and the boiler's power decreases. Therefore, the fuel needs to be poked. Burning coal is poked with poker through the gaps in the internal cast-iron door. A large amount of accumulated ash prevents the entry of primary air, which means that ashes need to be removed in time.

During heavy combustion, do not open fuel loading door.

Boiler stoking requires a lot of air, so sufficient amount of air has to enter the boiler room.



During stoking of the boiler, make sure that both the combustion chamber and fuel loading doors were tightly closed. During intense stoking, don't open them.



In the case of incorrect operation of the boiler, unsuitable fuel or low chimney draft, valves located in the chimney can get stuck, so, during every stoking, move the valves: open and close several times all the valves of the boiler.

6.6. Boiler extinguishing

In the case of normal operation, the boiler extinguishes itself, when the fuel load burns out. If forced extinguishing is needed, first of all remove fuel from the combustion chamber.



Put burning fuel into a container with water for less smoke generated in the room.

In the case of forced extinguishing, open doors and windows to ensure adequate ventilation.

6.7. Boiler cleaning

Ash, accumulated under the firegrate, can prevent air from entering the combustion chamber. Therefore, at least before every second firing, remove ash from the ash box and extract the remaining ash from the ashtray.



Clean the boiler, remove ash drawer and extract the remaining ash only after the boiler has completely extinguished and cooled.



Protect the air draft valve on the side of the ashtray from dropping ash which can hinder the valve operation resulting in poor combustion and difficult boiler operation.



Fig. 10.

In order to ensure efficient boiler operation, periodically clean soot away from boiler internal surfaces. Intervals between the cleaning depend on fuel quality (especially moisture), stoking intensity, chimney draft and other circumstances. We recommend cleaning boiler heat exchanger and combustion chamber when the soot layer is up to 3 mm, but at least monthly. Remove accumulated ash and soot. When cleaning, remove the rings and thoroughly clean internal planes of the boiler.

Remove ash and soot by opening the combustion chamber door, removing ash drawer and cleaning lid behind the drawer.



After installation and each cleaning of the boiler make sure that the ash cleaning lid is closed.
Combustion and draft efficiency depends on it.

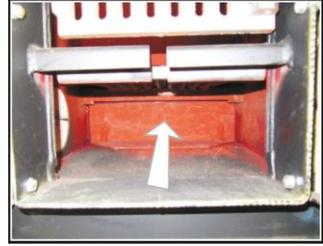


Fig. 11.

We advise, before the start of heating season and at least every 3 months during the heating season, clean the boiler connection flue pipe and chimney. Check fuel pipe connection status, look for leaks, eliminate them if found.

6.8. Frequently asked questions

I. What can happen in the case of electric power failure during stoking?

Without forced water circulation, there is the danger of water boiling; boiler overheating; if safety valve is in bad order boiler or pipeline may explode; boiling water may cause injuries.



a) Reduce burning intensity: close air supply valve; as far as possible close the smoke draft valve but don't let smoke to enter the room.



b) In the case of emergency, extinguish the boiler by removing fuel from the combustion chamber (for there was less smoke in the room, put burning fuel into a container with water, open doors and windows). Don't pour water into the combustion chamber, this may cause irreparable damage to the boiler.



c) When emergency is over, when pressure in the system drops down, refill the boiler and heating system with technical water, only after the boiler cools down.

d) In winter, when there is no electric power for longer period and there is danger of freezing, discharge water from the system.

II. Why, when stoking, strange (boiling) sounds are heard?

The boiler is operating at a higher than nominal capacity, the circulation pump operation is disturbed, the pressure in the heating system is too low.

a) Check that the air draft controller is correctly adjusted or not set at too high temperatures.

b) Check that the chimney draft is not too large, close smoke draft valve.

c) Water circulation may have stopped: check the circulation pump for operation; is the water level (pressure) in the system sufficient; whether the system is properly deaerated; are there closed system valves or there are clogged water filters.

- d) Check for worn door sealing parts of glass fiber, replace them if necessary.
- e) Check for ash falling through the air inlet hole in the ashtray, which prevents full closure of the air supply valve (see Fig. 10).
- a) Increase the water pressure in the system.

III. Why boiler “bleeds”, extinguishes itself, smoke gets from the boiler?

The boiler is running at too low power or there is not enough chimney draft, so condensation builds up.

- a) For less heat demand, use less fuel for burning rather than smoldering could go on.
- b) You can fully apply the smoke draft valve, thus improving the chimney draft and reducing boiler output.
- c) Use proper fuel: dry wood.
- d) Check for the ash scrub lid is installed correctly (see Fig. 11)
- e) Check for air supply valve grate is not covered (see Fig. 9).
- f) Check for when the boiler is fired no starting valve is open.
- g) Check for the temperature of the return water is not too low, adjust the mixing valve so that the return water temperature to the boiler is not lower than 60 °C.
- h) Check the chimney draft, clean the chimney, the flue pipe and the boiler itself; make sure that contents of ash under the firegrate is not too high.
- i) Check for door sealing parts from glass fiber are not worn out, replace them if necessary.
- a) There shall be sufficient air flow into the room where the boiler is located.

IV. Why, after starting the boiler, water pressure grows up?

After boiler reaches the nominal power, water pressure exceeds the permissible value.

- a) Expansion vessel may be too small or out of operation.
- b) Water circulation may have stopped: check circulation pump for operation; water level (pressure) in the system for sufficiency; due deaeration of the system; check for closed valves in the system or clogged water filters.
- c) Maybe pressure was exceeded when filling the system, reduce it.



We recommend to have the boiler checked every year by qualified boiler maintenance expert.

7. Transportation and storing

Boilers are stored and transported fastened on a wooden pallet and wrapped in polythene film if nothing else is provided for in the supply contract.

Boilers can be transported only in upright position on any type of covered transport. If weather is dry, open vehicle is also suitable.

Use extra safety means for boiler protection from overturning, scratching each other. Do not hit, turn, throw the boilers during loading-unloading.

Boilers have to be stored in dry premises without presence of vapours of chemically active substances.



The product packaging (wood pallet and polyethylene film) recovery must be in accordance with the environmental requirements and regulations of the user country. In the extreme case, the wooden pallet can be used as fuel for this boiler. The boiler fixing to the pallet screws can be used for boiler height adjustment during installation

8. Quickly wearing parts during operation

Sealing parts from glass fibre; cast iron rings, cast iron firegrate and internal cast iron doors during operation can wear out, burn out, crack.

You can order these parts from boiler manufacturer or its agents.

9. Fuel types and features

Completely dry wood burning heat actually does not depend on wood species and is equal to about 4500 kcal/kg. Therefore, at assessment of different wood species, their relative weight has to be taken into consideration. Weight of one cubic meter of various wood is as follows:

- oak firewood - 500 kg;
- birch firewood - 450 kg;
- spruce firewood - 330 kg;
- aspen firewood - 330 kg.

The wetter is the firewood, the lower is its caloric content. Wet firewood caloric content reduction, compared to dry firewood (~20 % moisture) is as follows:

- 30 % moisture - 10 ÷ 15 %;
- 50 % moisture - 35 ÷ 40 %.

Just cut tree has 35 ÷ 60 % of water. Least water is contained in the tree cut in the beginning of winter. Hard wood contains less water.

Wood for firewood has to be cut and split. After a year in attic, firewood has 20 ÷ 25 % of moisture.

After two years, it has 13 ÷ 17 %, which means that after drying, much less fuel is needed that when stoking wet wood.

Combustion of 1 kg of average calorific content coal gives about 6500 kcal (7,56 kWh).

10. Boiler disposition



Since the boiler is made of various materials, after its service life is over, dismantle the boiler and recover as follows:

- remove metal parts to metal scrap;
- remove remaining parts to dump or waste storage sites.



Recovery actions shall be in line with the laws and regulations valid in the user's country.

11. Acceptance certificate

Kitchen solid fuel central heating boiler **Kalvis-4** meets the drawings, requirements of standards *LST EN 13240:2002*, *ГОСТ 9817-95* and *ГОСТ 20548-93* and is fit for operation.

The boiler was tested with 4,0 bar (0,4 MPa) pressure.

Factory No. _____

Date of manufacturing _____

Inspector _____

12. Product parts

- | | |
|---|--------|
| 1. Boiler Kalvis-4 " | - 1 pc |
| 2. Thrmomanometer | - 1 pc |
| 3. Ash removal scoop | - 1 pc |
| 4. Poker | - 1 pc |
| 5. Boiler technical data sheet | - 1 pc |
| 6. Wood transportation pallet (with fastening screws) | - 1 pc |



13. Product warrantee

Manufacturer guarantees that the product is in line with the technical document specifications.

If you correctly install and operate the boiler in accordance with these instructions, the following guarantee service period will be applied calculated from the purchase date:

- for boiler case - 48 months.
- for completing parts - 12 months.
- for wearing parts (see p. 10) - 6 months.

Manufacturer obliges to eliminate failures occurring due to its fault during the mentioned period for free.

For warrant repairs apply, In the case of boiler failure, to this service providing company, specified by seller.

We ask user to take care for after warrant repairs service employee made relevant record in this certificate "Notes about warrant and non-warrant repairs" and filled warrant repairs report.



Manufacturer's guarantee does not apply if

- No purchase documents are submitted (VAT invoice, cashier's check or cash receipt voucher);
- Having lost this technical passport with manufacturer's and seller's notes, or if the notes are not filled, or if manufacturer's number is different from the number on the boiler;
- There are visible mechanical damages which could cause boiler failure;
- The boiler failed due to incorrect connection or maintenance;
- There are unauthorized construction changes;
- It is found that the boiler was repaired by unauthorized person;
- The boiler was used not in line with the user manual (wrong fuel);
- There are deformation or burnt metal (caused by using incorrect fuel or loading too large fuel charges);
- The boiler failed due to natural calamities.

I familiarized with warrant repairs conditions. I am informed that in the case boiler is installed and operated without observing the requirements given in this manual, I loose the right for warrant repairs.

Buyer: _____
(name, surname, signature)

SALES NOTE

Boiler sold by:

Company: _____

Sales date: _____

Address: _____

Telephone: _____

In the case of failure contact:

Company: _____

Address: _____

Telephone: _____

Manufacturer ***UAB “Kalvis”***
Pramonės 15, LT-78137 Šiauliai, Lietuva (Lithuania)
Telephone: +370-671-88891
E-mail: prekyba@kalvis.lt

Warranty service ***Provided by a partner you bought a product***

NOTES ON WARRANT AND NON-WARRANT REPAIRS PERFORMED

<p>Company: _____ Address: _____</p> <p>Expert: _____ Telephone: _____</p> <p>Failure, works carried out: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Repairs date: _____ Expert's signature: _____</p>
<p>Company: _____ Address: _____</p> <p>Expert: _____ Telephone: _____</p> <p>Failure, works carried out: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Repairs date: _____ Expert's signature: _____</p>
<p>Company: _____ Address: _____</p> <p>Expert: _____ Telephone: _____</p> <p>Failure, works carried out: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Repairs date: _____ Expert's signature: _____</p>

Product barcode sticking place.