

KASTOR

KASTOR KARHU

Wood-burning heater Installation and user manual

(Karhu- 22, 30, 40, 22V, 30V, 40V)



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Installation and user instructions for KASTOR KASTOR series sauna heaters

Save this manual for later reference.

After installation, the User Manual must be given to the owner of the sauna or the person in charge of its use.

Read the Manual before installation and use and follow the instructions.

1. Before installing

Check the product and the package contents straight after delivery. Let the courier know about any transport damage immediately.

1.1. Contents of the package and checking

Contents of the heater package:

- Sauna heater
- In the furnace
 - Installation Guide
 - Grate
 - Connection pipe
 - Adjustment screws (2 pcs)
 - Door handle, mounting screw and nuts
- Two steel caps: one for the soot hatch in the stone compartment, one for the back wall flue hole – bolted into place using a drilling screw drilled through the cover.
- Ash pan

1.2. Considerations and instructions

Check the suitability of the heater for the sauna, refer to the maximum and minimum cubic volumes. Table 1

Due to stone and glass walls, 1.5 m³ has to be added to the volume calculations for each square metre of firewall or other stone and glass wall.

In saunas with timber walls, 25% is added to the calculated volume.

In order to avoid damages during transport, the heater must be transported in an upright position.

All advertising labels and packaging material must be removed before the sauna heater is used.

The type plate and the CE marking must not be removed.

The ash pan must be closed during heating.

BURN IN THE HEATER OUTDOORS BEFORE INSTALLING IN THE SAUNA.

In addition to these instructions, all local regulations must be followed, including those referring to local and European standards. They must be complied with when installing the fire chamber.

You must also find out about any necessary building planning permissions and the floor load capacity before installing the heater.

Before installing the chimney, you must also check the chimney's temperature class.

- Average temperature of combustion gas on nominal output. Table 2
- Maximum temperature of combustion gas in safety test. Table 2
- Temperature classification for the chimney is T-600

Check the following issues and choose the location for the heater accordingly:

- Safety distances to flammable and non-flammable structures
- Location of the chimney connection (the height of the old chimney connection, if any, from the floor, or installation route for a new chimney)
- Floor material (flammable, non-flammable, tiled, waterproofed).

If the heater will be connected to a divided chimney (another stove has already been connected to the chimney), each connection must have its own damper. The chimney must be sized in line with the larger stove.

Before beginning heating, also make sure that the smoke flue draft is sufficient and that the heater is not damaged.

- Draft in the chimney is -12Pa on nominal output.
- Draft can be roughly checked for example by burning a bit of newsprint in the heater.
- Before starting a fire in the heater, switch off any device that might create a vacuum, such as an extractor fan or a forced ventilation system. If the forced ventilation system is equipped with a fireplace switch, use it following the instructions supplied with the system.
- If the heater has its own external delivery pipe for combustion air, make sure it is open and that there are no items causing a blockage in front of it and that there is a supply of air. The delivery pipe can be located down by the heater on the wall or floor. It must be equipped with a grille which can be closed or something similar. The minimum pipe diameter is 10 cm.
- Kastor heaters are meant to be used for heating a sauna. They must not be used for any other purpose.
- The heater is not meant for continuous 24 hour use.

- Sea water, rainwater or water containing chlorine must not be thrown onto the stones, use clean water only.
- In the proximity of sea water, there is also the risk of corrosion for the heater; operating life may be shorter.
- Decorative or other items must not be placed on the heater. The heater must not be covered when it is heated, or when it is hot. E.g. drying clothes or other flammable material on the heater is forbidden due to fire risk.
- In order to guarantee full output and safety, the fire door must always be kept shut when heating. The fire door can be open during heating only when adding more firewood, and the heater must be continuously observed. Monitor sauna temperature so that the heater will not overheat. If the heater becomes overheated, open the sauna door and allow ventilation.
- Fire doors and glass surfaces must be handled carefully.
- The fire door handle may be hot; use a tool, e.g. a glove, when opening.
- If the heater has not been used for a long time and is located in a damp space (e.g. an unheated holiday house), it must be carefully checked before use for corrosion damage and to make sure the chimney is not blocked, for example by a bird's nest.
- If a chimney fire occurs, or if there is a risk of one, close the fire doors but leave the damper on the flue open.
- Call the fire brigade if you need help with putting the fire out. *After a chimney fire, a local chimney sweep must always check the condition of the flue.*
- A chimney fire, even one that was put out, must always be reported to the fire authorities.
- Be careful! Handles, fire door glass and the surface of the heater, as well as recirculated air may be hot!
- Do not let children light fires or stay near a burning fire unless supervised by adults.
- Follow the instructions when heating and installing the heater.
- The heater can only be heated using unprocessed firewood.
- Structural changes must not be made to the heater.
- Only use original equipment and parts approved by the manufacturer.

2. Installation and preparations for use

2.1. Bringing into service condition and burn-in

- Install the handle to the door.
- Place the heater on a non-flammable surface outdoors, without stones.
- Models with a water tank: attach the tap and the cap, fill the tank with water.
- Remove all extra stickers and protective plastic (excluding type/CE mark stickers).
- Make sure that the grate is in place.
- Install the included connecting pipe to the flue opening above the heater, the shorter section into the heater.
- Check that the caps for the soot hatches and the flue opening are secured.
- BURN-IN: The purpose of burn-in is to burn the protective agents off the stove outdoors, and cure the heater finish. Burn a furnace-full of small chopped wood. Continue burning the heater outdoors until the heater emits no odour.
- Let the heater cool down and move it indoors to the sauna.
- Make sure there's ample ventilation during the first heatings.

2.2. SIDE WATER TANK WTR AND WTL

Empty the water tank before outside temperatures drop below zero; the tank will be damaged if water freezes in it.

Do not heat the heater while the water tank is empty

Remove any plastic film from the tank cover

Installing the water tank tap. Figure 1.

A tap, two seals and a nut are included. The tank is attached as follows:

- Lift the water tank off.
- Push the tap into the hole on the heater cover.
- Place the first seal on the threaded part of the tap.
- Lift the water tank back into position and place the tank hole onto the threaded part of the tap.
- Place the second seal on the threaded part of the tap inside the water tank.
- Place the edge of the water tank on the side bracket.
- Place the nut into the threaded part of the tap and tighten with a wrench from inside of the water tank. Do not tighten too much to avoid damaging the gaskets.

2.3. Heater stones, placing the stones

Use peridotite or dunite stones over 10 cm in diameter. Wash the stones before placing them into the stone compartment. Do not place the stones too tightly or pile them too high. Leave enough space between the stones. Place the stones vertically instead of horizontally to allow hot air flow from underneath all the way to the top stones. Fill the entire stone compartment, place flat stones vertically, pay attention to the maximum amount of stones. Table 1

More balanced heat properties can be reached by using a mix of differently sized and different types of stones and adjusting the amount of stones. As stones and layouts are unique, there are no generally applicable rules. Try placing the stones in different ways to find the ideal layout for your needs.

In order to operate properly, it is vital that hot air can flow freely in between the stones and heat them up quickly. If the stones are too small or incorrectly laid, the air in the sauna space will heat up, but the stones won't.

Clean the stone compartment and check the condition of the stones approximately once every six months.

2.4. Heater base

Install the heater on a level, fixed and solid base, which is inflammable or insulated against fire. The separate protective base for Kastor heaters, for example, meets all these requirements (it comes with four adjustable legs).

DO NOT INSTALL THE HEATER ON A FLOOR MADE OF FLAMMABLE MATERIAL WITHOUT A PROTECTIVE BASE The heater can be installed directly to a concrete floor, provided that the thickness of the slab is at least 60 mm.

Make sure the poured floor under the heater does not include electrical wires or water pipes.

The heater's front corners have slots for adjustment screws, which can be used to level the heater on a slanted floor.

The adjustment screws are supplied in an accessory bag in the furnace. Screw them into place and adjust as necessary.

Installing the heater directly on a tiled floor is not recommended because, for example, moisture seals and tile adhesives may include substances that are not resistant to heat. Check the floor's load bearing capacity.

3. Safety distances and protection

3.1. safety distances

Safety distance to a stone wall is 50 mm from the outer surface of the heater. 100 mm is preferable to allow sufficient air flow.

Refer to Table 1 for heater-specific safety distances to flammable materials

If the smoke flue has a non-insulated interconnecting pipe or a bended pipe above the heater, the safety distance is 400 mm on sides and 400 mm upwards as measured from the horizontal surface. Please refer to the installation instructions for the safety distances indicated by the flue manufacturer before installation.

In heaters with a water tank, the safety distance between the tank and flammable materials is 150 mm.

3.2. Reducing safety distances

Kastor protective walls can be used to achieve smaller safety distances (Figure 8)

If the floor in the front of the heater is flammable, the floor must be protected with a metal sheet at least 1 mm thick (spark protection sheet) at a distance of 400 mm to the front and 100 mm to the sides, as measured from the fire door.

If the heater is installed in a corner, with a brick wall behind the heater and on one of the sides, the safety distance is 50-100 mm on the side and 50 mm at the back. If there's a brick wall on both sides and at the back, a safety distance of 100 mm to both sides is recommended to allow sufficient air flow. At the back, the previously mentioned 50 mm will suffice.

4. Heater connection to a smoke flue

4.1. Back connection.

Make a hole in the brick chimney which is 2–3 cm bigger than the connecting pipe.

Remove the plate covering the round hole at the back of the heater cover by using a screwdriver or the end of a hack saw. Install the plate to cover the hole for top connection instead. Install the connection pipe supplied with the heater to the rear flue opening and the shorter section into the heater. Push the heater in place.

Make sure that the connection pipe sits well in the opening at the chimney.

Seal the empty space between the connection pipe and the chimney by using flexible, fire-resistant material, such as fire wool. The connection is finished by using a cover plate, available from a hardware store. Fix the cover plate to the chimney using metal fixtures or fire-resistant putty.

4.2. Top connection

Install the heater's own connection pipe to the upper flue opening and the shorter section into the heater.

Make a hole in the brick chimney which is 2–3 cm bigger than the connecting pipe.

The top connection is made by using a bended pipe, which can be turned to match the chimney.

Bended pipes are available at hardware stores. A bended pipe can be extended, when necessary. Install the heater's own connecting pipe to the upper flue opening on top of the heater. The bended pipe in question is installed on top of the heater's connecting pipe. Use a saw to adjust the length of the bended pipe and extension, if any. Make sure the pipe goes deep enough into the chimney (not too far; the chimney may be blocked).

Seal the empty space between the pipe and the brick chimney by using flexible, fire-resistant material, such as fire wool.

The connection is finished by using a cover plate, available from a hardware store. Fix the cover plate to the chimney using metal fixtures or fire-resistant putty.

4.3. Connection to a ready-made flue

The Karhu heater can be connected from the top to a ready-made flue.

Select the correct ready-made flue in accordance with factors such as the heater model, the height of the flue, external conditions and temperature class T-600. A damper plate must be installed in the flue.

- Install the heater's own connection pipe to the upper flue opening and the shorter section into the heater.
- Install a non-insulated interconnecting pipe on top of the connection pipe.
- Install the damper between the non-insulated and insulated part, or alternatively, into the first insulated chimney flue module

- Continue using insulated modules on top of the damper. The minimum distance between the insulated chimney and ceiling is 400 mm. Follow the installation and user instructions for ready-made flues. Fig. 5

Adhere to the safety distances to flammable and non-flammable materials.

For chimneys, safety distances to flammable materials are product-specific. Check the manufacturer's instructions.

If in doubt, contact the local fire authorities.

Sauna360 Oy is not liable for suitability or performance of other manufacturers' ready-made flues used in connection with Kastor heaters.

Sauna360 Oy is not liable for the quality of other manufacturers' ready-made flues.

The temperature classification for the chimney must be T 600.

5. Heater door and changing left/right-handedness

The door's opening direction can be changed by turning the door over.

Changing the door's left/right-handedness:

- Open the door and push the hinge pin from below to release it from its hole.
- Pull the hinge pin down to release it from the upper hole; the door is now detached. Pay attention to the washer and locking nail.
- Turn the door around so that the handle is on the preferred side.
- Start by pushing the hinge pin into the upper hole in the frame, and insert the washer to the pin on top of the frame (the part of the pin with notches should face down).
- Insert the upper hole of the door to the hinge pin above the frame.
- Finally, guide the hinge pin into the lower holes in the frame and the door.

6. Grate

There is a grate in the heater's stove. Place it on the brackets on the bottom of the stove. Keep the grate clean and empty it before the next heating to allow air to flow through the grate into the furnace. Fig. 6

7. General advice on preventing damage

When you bring the heater into the sauna room, burn another batch of wood before placing the stones and make sure that there's plenty of ventilation. This way any residual protective agents will burn off and the finish is properly cured.

Read the instructions below and make sure to follow them:

- Wood quantities can be found in table 2.
- In cold conditions, avoid heating at full power. The brick chimney may crack.
- Avoid throwing water straight onto the glass door.
- Do not heat the sauna heater so that the cover is red-hot.
- Exposure to saltwater will shorten the heater's life cycle significantly. Please note that even water from a well can contain salt in the vicinity of sea.
- The warranty is void if saltwater is used in the heater.
- Other factors contributing to the heater life-cycle are correct size for the space, the fuel used, the number of heating cycles, failure to follow instructions when using the heater, and general diligence.
- Kastor heaters are carefully designed and tested. If a heater becomes damaged in use in an unreasonably short time (e.g. the covers or top part are torn or burned through etc.), it can be fairly said on the basis of research data that the heater has not been used as instructed. Sauna360 Oy will not be liable for damage resulting from misuse or use against instructions.

8. Using the heater

8.1. Fuels

Only natural wood can be used as fuel in Kastor heaters, preferably chopped birch or alder (refer to Table 2 for batch sizes). The length of firewood is approximately 33 cm. Dampness 12–20%. NOTE! Damp or decayed wood does not provide heat very well and emissions are higher.

The amounts of wood mentioned in Table 2 correspond to the values of a nominal output test in compliance with EN-15821, where the volume of the sauna room is the maximum volume. When heating the sauna for the first few cycles, use smaller amounts of wood than listed in the table to find the ideal batch size for your sauna.

Do not exceed the amounts of wood mentioned in the table

The following materials are not allowed in the heater furnace: impregnated wood, wood containing nails, chip board, plastic, plastic coated board or paper.

Liquid fuels are not allowed, not even when starting the fire because of the risk of a flash fire. Do not burn large amounts of small pieces of wood, such as chips or small pieces because of their high temporary heating effect.

Firewood must not be stored immediately next to the heater. Pay attention to the heater's safety distances.

8.2. Adjusting the air flow

The heater has been designed to perform best when the negative pressure of the flue is approximately –12 Pa. If the chimney is long, this optimal negative pressure limit may be exceeded. Adjust the draft and combustion air flow using a damper so that it is suitable. Be careful of carbon monoxide. The damper must not be closed too far!

When lighting the fire, the door may be kept slightly open for a moment. The ash pan must be closed and it may not be opened during burning. Combustion air comes from another source. The ash pan has a catch to prevent opening, when there's fire.

8.3. Adjusting heating efficiency

The amount of wood when stoking determines the heating efficiency. For correct amounts of wood that ensure the wood burns in line with the CE marking, refer to Table 2.

The heating efficiency depends on the quality and the amount of fuel.

8.4. Lighting

- Place the first batch of wood loosely in the furnace. Table 2
- Add kindling between the logs and light them.
- You can keep the fire door ajar for a moment while the logs start to burn.

8.5. Stoking the furnace

Add another batch of wood when the fire has nearly burned down to embers. Table 2

Add the wood lengthwise, i.e. parallel to the grate opening. Close the fire door.

The sauna room is normally ready for bathing in 40 to 50 minutes.

If several full batches of wood are burned in the heater consecutively, the heater and the pipe will become overheated, which might result in an increased risk of fire.

9. Maintenance and repairs

9.1. Cleaning the heater

The surface of the heater may be cleaned with mild detergent and moist, soft cloth.

Clean the fire door glass with a soot cleaner agent (e.g. Noki Pois) available from hardware stores.

9.2. Removing the ashes

Excess ash will shorten the grate's life cycle and weaken burning. Fresh air enters the furnace through the heater back wall under the grate, which is why it is important to remove ashes from the heater before using it again (Figure 9).

Always remove the ash before using the heater, unless the ash is still hot.

9.3. Chimney sweeping

The opening in the stone compartment is a soot hatch (covered with a cap).

The inner parts of the heater are cleaned through the soot hatch 2 to 4 times a year depending on frequency of use.

Empty and clean the stone compartment and check to condition of the stones at the same time.

Soot hatches open when they are lifted upward parallel to the surface.

If the cap has stuck because of temperature fluctuation, use a bending iron or a hammer.

9.4. Cleaning the fire chamber glass

Handle the glass door carefully. Do not bang the door shut or use it for pushing wood into the furnace. Clean the glass with Noki Pois or a similar soot cleaning agent.

9.5. Replacing broken glass panel

- Remove the door as instructed in section 5.
- Remove all pieces of broken glass carefully.
- Straighten the tabs at the corners and remove the four (4) locking springs inside the mouldings.
- Push the glass into the upper moulding and insert it into the lower moulding by sliding the glass. Adjust the glass to the centre.
- Push the locking springs in at the ends of the mouldings, and bend the tabs against the glass.
- Attach the door to the heater as instructed in section 5.

10. Troubleshooting

If the heater or the sauna doesn't perform as you think it should, check it following the below list. Make sure you have selected the correct heater to match the sauna room's volume.

The heater is too hot (red-hot)

The draft exceeds -12Pa

- lower the draft with the damper

The stones are laid too tightly or they are too small.

- place the stones more loosely and use stones that are min. 10 cm in diameter.

There's too much wood, or the pieces are too small.

- table 2 has the maximum amounts of wood for the heater, do not use more.

- do not burn large amounts of small pieces of wood, because their temporary heating effect is high.

- let the previous batch of wood become embers before adding the next batch

There's smoke in the sauna room, the draft is bad.

Turn off all equipment that may cause low pressure.

Is the damper open?

Is the connection pipe sealed against the heater and the flue?
 Is the connecting pipe installed so that the shorter end is connected to the heater? (Check this through the soot hatch in the stone compartment.)
 Is the alternative flue opening sealed with the included cover?
 Is the heater's soot hatch securely shut?
 Is there ash in the heater channels?
 Is the interconnecting pipe from the heater to the flue free from ash?
 Is the flue completely open? Is it unswept, filled with snow, covered with winter cover etc.
 Is the chimney in good condition? Cracks, weathering.
 Is the draft height (chimney height) sufficient for the surrounding environment?
 - If there are trees close by, a steep hill etc., the chimney needs to be over 3.5 m measured from the floor.
 Is the flue size correct?
 - the minimum diameter is half a brick for brick flues or 115 mm for round flues

The stones do not become hot enough.

Have you burned enough wood in the furnace?
 Burn enough wood in the heater; refer to the amounts of wood in Table 2.
 Is the draft too weak?
 Is the amount of stones correct?
 - At the sides, there should be stones to the level of the sides, and in the middle, only half a stone can raise above the side level.
 Are the stones too tightly packed?
 - Place the stones loosely, so there will be enough space between the stones.
 Are the stones of good quality and the right size?
 - Use peridotite or dunite stones, min. 10 cm in diameter. Flat stones are placed in an upright position.

The sauna room won't become warm enough.

Are the doors, windows and air conditioning closed, and the combustion air opening open?
 Is the sauna new, are the wooden structures damp for some other reason?
 Is the heater used correctly?
 Have you burned enough wood in the furnace?
 - Burn according to instructions.
 Is the draft too strong?
 - Use the damper to adjust the draft.
 Is the draft too weak?
 Has the heater been sized correctly?
 Is the draft height (chimney height) sufficient for the surrounding environment?
 - If there are trees close by, a steep hill etc., the chimney needs to be over 3.5 m measured from the floor.
 Is the amount of stones correct?
 - At the sides, there should be stones to the level of the sides, and in the middle, only half a stone can raise above the side level.
 Are the stones too tightly packed?
 - Place the stones loosely, so there will be enough space between the stones.
 Are the stones of good quality and the right size?
 - use peridotite or dunite stones with a minimum diameter of 10 cm. Place flat stones vertically.

The sauna heats up quickly, but the stones are not hot.

Is the amount of stones correct?
 - At the sides, there should be stones to the level of the sides, and in the middle, only half a stone can raise above the side level.
 Are the stones too tightly packed?
 - Place the stones loosely, so there will be enough space between the stones.
 Is the heater too big?
 - keep the ventilation valve open to keep extra heat out. This way the stones will have time to heat up as well.
 It will take a bit longer to heat the sauna this way.

The water doesn't heat up properly in a heater model with a water tank.

Is the draft too strong?
 - There's a flame in the interconnecting pipe, which is red hot, even though the lower part of the heater, inside the cover, does not burn red.
 Has the heater been sized according to the instructions?
 Check if the side of the water tank facing the heater frame is painted black.

There are black flakes under the heater.

The flakes can be metallic anvil cinder, fallen off the heater. This indicates that the heater has been used too aggressively, causing the metal to flake and the heater to break prematurely.

Do not heat the sauna heater so that the cover is constantly red-hot.

There's a smell of sulphur in the sauna.

The stones have sulphur residues from blasting, or the stone includes sulphur naturally.

11. Manufacturer's declaration

This product fulfils claims mentioned in the certificate of approval and documents related to it.
www.Sauna360.com

12. Warranty and manufacturer identification

WARRANTY

Sauna360 products are reliable and of high quality. Sauna360 grants a 2 year factory warranty to its wood-burning sauna heaters covering manufacturing defects. For products in public and commercial use, the warranty is valid for three months. Damages caused by incorrect use or use which is not in accordance with instructions will not be covered by the warranty.

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Table 1

Model	Volume of the sauna room m ³	Output (kW)	Dimensions (mm)			Safety distance to flammable material (mm)				Weight (Kg)	Amount of stones (Kg)
			width	depth	height	Front	Side	Back	Up		
KARHU-22	12-22	14	450	485	785	500	300	300	1240	61	25-30
KARHU-30	20-30	17	490	485	915	500	300	300	1310	84	35-40
KARHU-40	30-40	15	580	585	925	500	300	300	1300	125	50-55

Water tank models

KARHU-22 VO	12-22	14	620	485	785	500	300 / 150*	300	1240	67	25-30
KARHU-22 VV	12-22	14	620	485	785	500	300 / 150*	300	1240	67	25-30
KARHU-30 VO	20-30	17	660	485	915	500	300 / 150*	300	1310	90	35-40
KARHU-30 VV	20-30	17	660	485	915	500	300 / 150*	300	1310	90	35-40
KARHU-40 VO	30-40	15	740	585	925	500	300 / 150*	300	1300	131	50-55
KARHU-40 VV	30-40	15	740	585	925	500	300 / 150*	300	1300	131	50-55

For every square meter of brick, concrete surfaces, tile and glass, you should calculate an additional 1.5m³ volume

If the sauna walls consist of uninsulated log, add 25% to the volume.

Model	Flue opening, inside diameter (mm)	Distance from the floor to the bottom of the smoke exhaust port (mm)	Distance from the back of the heater to the centre of the flue opening (mm), top connection	Water tank volume (l)	Sauna room min. height (mm)	Max. length of fire wood (mm)
KARHU-22	115	512	126	-	2100**	380
KARHU-30	115	645	126	-	2300**	380
KARHU-40	115	655	126	-	2300**	450

Water tank models

KARHU-22 VO / VV	115	512	126	28	2100**	380
KARHU-30 VO / VV	115	645	126	28	2300**	380
KARHU-40 VO / VV	115	655	126	28	2300**	450

VO= Water tank on the right when seen from the front

**Under the minimum height, a protective plate must be installed on the ceiling

VV = Water tank on the left when seen from the front

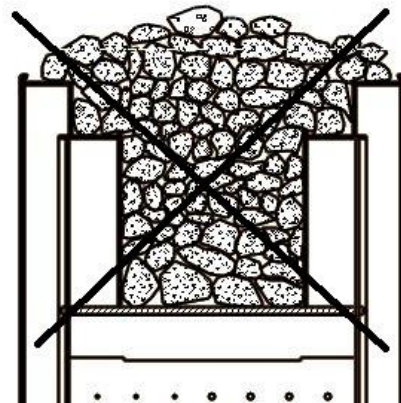
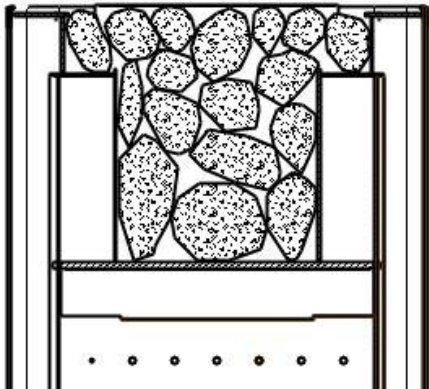
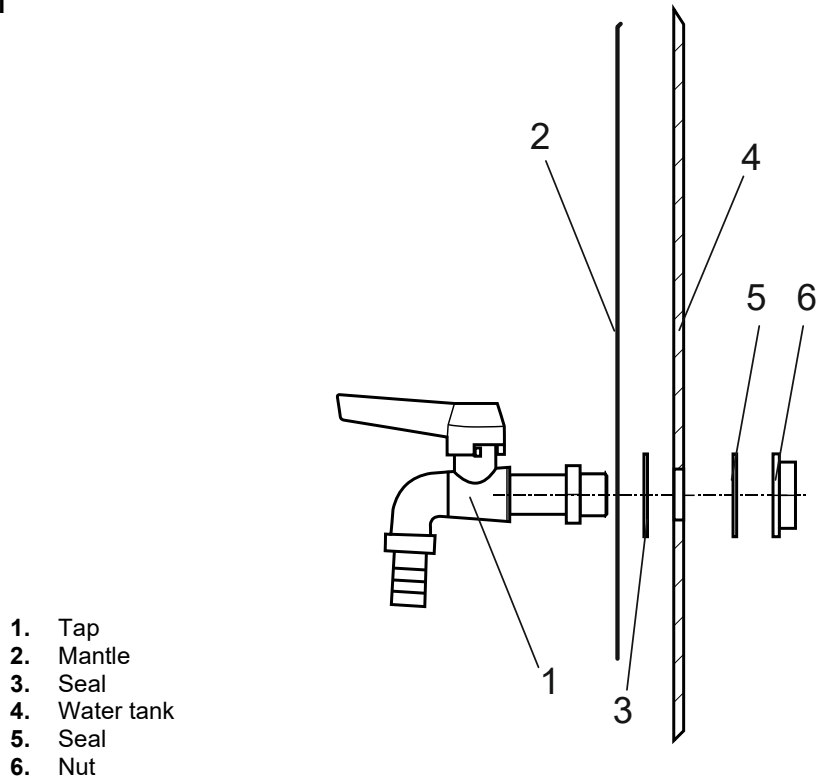
*Distance from the water tank side

Table 2

	Karhu-22 Karhu-22 VO Karhu-22 VV	Karhu-30 Karhu-30 VO Karhu-30 VV	Karhu-40 Karhu-40 VO Karhu-40 VV
Fuel	Wood	Wood	Wood
Fire safety	Pass	Pass	Pass
Mean flue gas temperature	390°C	401.5°C	338°C
Total heat output	14 kW	17 kW	15 kW
Carbon monoxide emissions at 13% O₂	0.44 %	0.34 %	0.33 %
Efficiency	70.2%	72.3 %	74.6 %
Flue draft	12 Pa	12 Pa	12 Pa
Ignition load	6 kg	7 Kg	8 Kg
Refuelling loads	4.5 kg	6.5 Kg	5 + 4 Kg
Temperature class of chimney	T – 600	T – 600	T – 600
Safety distances to combustible materials	Table 1	Table 1	Table 1
Combustion gas maximum temperature	505°C	508°C	427°C
Surface temperature	Pass	Pass	Pass
Durability	Pass	Pass	Pass

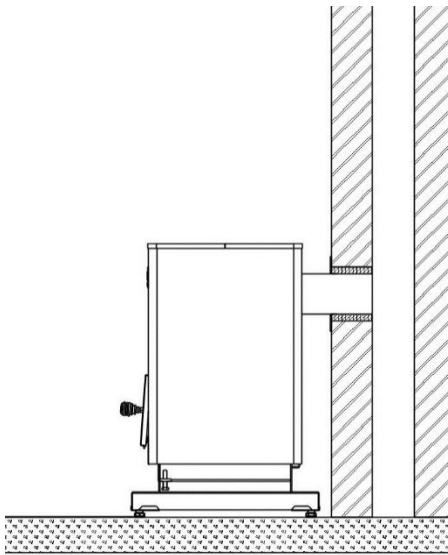
Pictures

picture 1



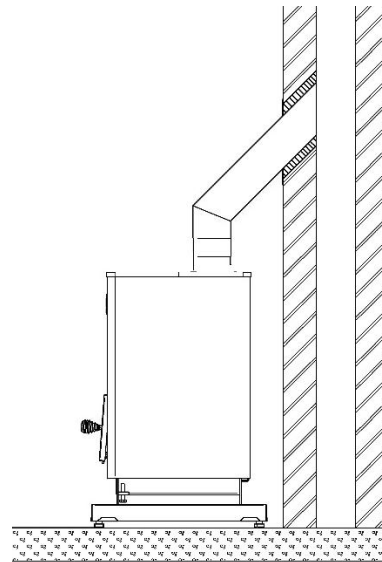
picture 2

Placing the stones, a cross-section of the heater stone compartment
Place the stones loosely, so there will be enough space between the stones.



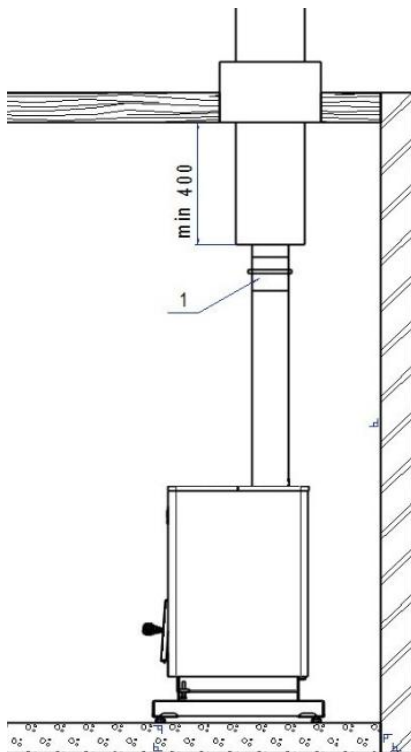
picture 3

Connecting the stove from the back to a brick chimney



picture 4

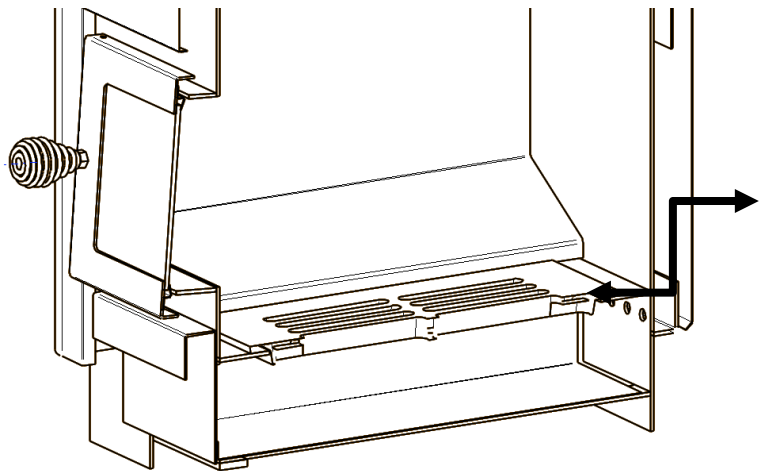
Connecting the stove from the top to a brick chimney



picture 5

Connection to a ready-made flue.

1. Chimney valve device



picture 6

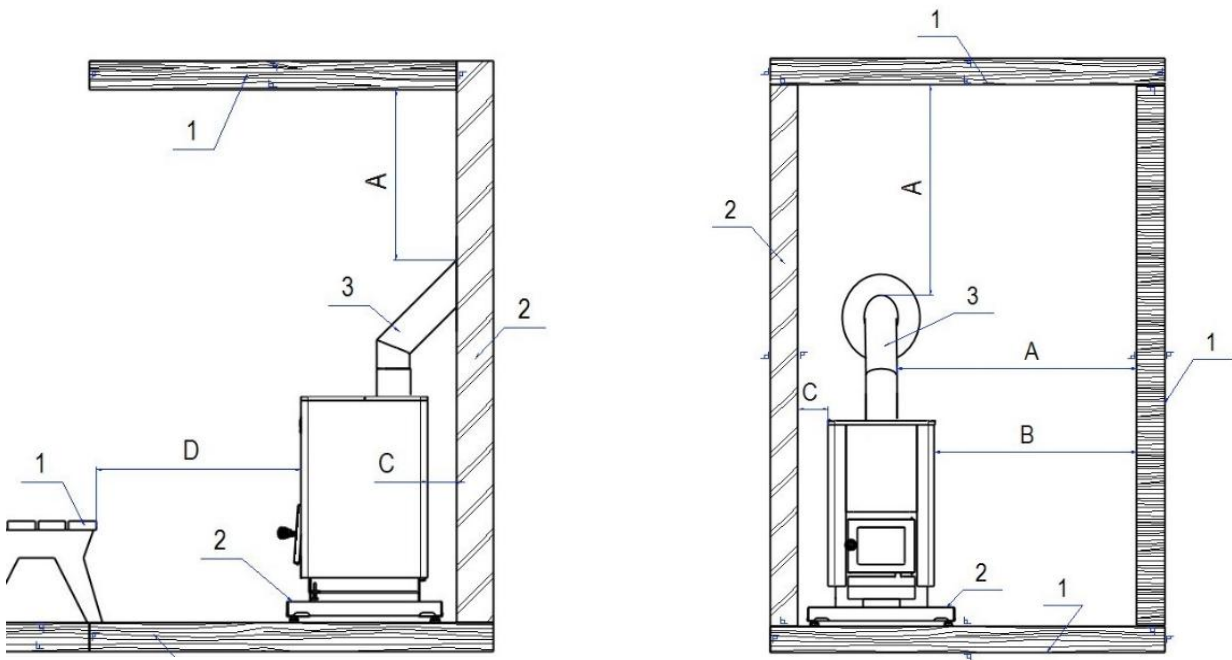
For optimal performance, it is important to empty the heater's ash pan after every use to keep the combustion air opening under the grate open, allowing air to flow freely into the furnace.

Heater safety distances

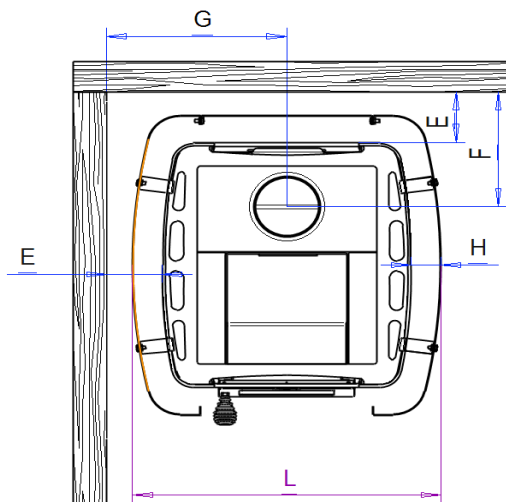
1. Flammable material
2. Non-flammable material
3. Smoke flue

- A. Uninsulated safety distance to flammable material from the surface of interconnecting pipe: 400 mm.
- B. Heater safety distance to flammable material, side and back: 300 mm.
- C. Heater minimum distance to non-flammable material: 50 mm.
- D. Heater safety distance to front: 500 mm.

picture 7



picture 8



	E	F	G	H	L	L*
Karhu-22	100	225	325	54	565	730
Karhu-30	100	225	345	54	610	770
Karhu-40	100	225	390	54	690	850

L* - Water tank model