

**TECHNICAL INSTRUCTION
INSTALATION - USE - MAINTENANCE**



ECO KE / VKE

CONENT

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GENERAL INFORMATION

- Boiler ECO-KE is a hot water boiler with the latest design and construction. Designed for heating with solid fuel, pellets, oil and gas. Made of quality steel, preparation and installation of parts performed with the most modern technology of lasers and robots for welding sheet metal.
- The boiler is certified and fully meets the environmental requirements of the European Union defined in EN 303-5 and EN 304 and ISO 9001: 2008, manufactured to fully comply with the conditions for use in central heating systems from the smallest to large facilities.
- Three-pass solid fuel boiler TOP-V is equipped with fan on the front side and simple regulation unit. It fulfills the requirements of the European norm EN 303/5 (Class 4).
- The boiler is designed so that all the parts in contact with exhaust gases are water cooled.
- The boiler is constructed with the best ratio between combustion chambers, floor passages and gas conduction so that it is very economical during operation with a high degree of efficiency.

INTRODUCTORY NOTES

- The user should strictly adhere to the stated technical instructions, because otherwise the warranty of the boiler and any damage will not be recognized by the manufacturer.
- Strictly take care that during the operation of the boiler there is no closing of the valve on the distribution and return line of the boiler, in order to avoid water expansion and bursting of the boiler. The warranty in this case is not recognized.
- At the first start-up of the pump as well as at the beginning of the heating season, the circulation pump must be started mechanically.
- It is very important to maintain the boiler every day. Detailed cleaning of the boiler is necessary every week, as well as regular removal of ash from the boiler. The inner part of the boiler has an accessible cleaning approach. Life is shortened.
- During boiler operation, there is a possibility of wetting and dripping in the chimney area and in the furnace.

If the pressure in the system is constant, the mentioned phenomenon is condensation of the boiler because of the:

- a. Incorrect boiler capacity determination
- b. No mean valve was installed to protect the boiler from overcooling
- c. Excessive air intake through the door (the door should be closed);

- *In case of condensation due to the stated reasons and not due to leakage, the arrival and costs of the servicer are charged*
- In case of a poorly designed system and selection of boilers, the set of responsibility and possible costs shall be borne by the person to whom the design and construction of the heating installation has been checked and not by the boiler manufacturer, representative or seller.

SAFETY NOTES

- During the operation of the boiler, the parts are hot, and during contact use protective gloves;
- It is obligatory to thermally insulate the flue pipe (boiler and chimney connection)
- It is forbidden to use the boiler if certain parts of the boiler are damaged;
- In the closed heating system obligatory to set the overheating protection valve;

CONDITION AT DELIVERY

What's in the box?

The following parts are supplied together with the boiler

- Boiler thermometer;
- Boiler ash-tray;
- Cleaning kit;
- Warranty notes;

COMMISSIONING AND USING THE BOILER

- The first commissioning is performed exclusively by an expert;
- The boiler must not be operated in a flammable and explosive atmosphere;
- Before commissioning, check the pressure in the boiler and system as well as the irradiation;
- Check that the boiler and the entire heating system are filled with water;
- Children must not handle the boiler and should be supervised;
- Check that the flue pipe is well insulated;
- Check that the dampers in the boiler furnace and the grille are in place;
- By switching on the circulation pump, the boiler is ready for heating;

1. BOILER DESIGN TYPE ECO-KE 20-110 kW

	<table border="0"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> 1-Pedestal 2-Burning chamber 3-Pipe grid 4-Lower door 5-Filling 1/2 6-Return pipe 7-Flue gas 8-Muf ½ sonda 9-Flow pipe 10- Heat exchanger tube 11-Draught regulator </td> <td style="vertical-align: top; padding-left: 20px;"> <ul style="list-style-type: none"> 12-Uper door 13-Ash box 14-Klapne 15-Muff ½ sonda </td> </tr> </table>	<ul style="list-style-type: none"> 1-Pedestal 2-Burning chamber 3-Pipe grid 4-Lower door 5-Filling 1/2 6-Return pipe 7-Flue gas 8-Muf ½ sonda 9-Flow pipe 10- Heat exchanger tube 11-Draught regulator 	<ul style="list-style-type: none"> 12-Uper door 13-Ash box 14-Klapne 15-Muff ½ sonda
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DIMENSIONS

Tip (kW)	Weight (kg)	B (mm)	L (mm)	H (mm)	E (mm)	G (Ø)	L (mm)	B (mm)	H (mm)	H (mm)	H (mm)	H (mm)
20	230	460	910	1200	160	1"	610	420	170	440	910	1100
25	244	460	960	1200	160	1"	660	420	170	440	910	1100
30	265	510	960	1200	160	1"	660	470	170	440	910	1100
35	287	560	960	1200	160	5/4"	660	520	170	440	910	1100
40	311	610	960	1200	180	5/4"	660	570	170	440	910	1100
50	330	610	1025	1200	180	5/4"	725	570	170	440	910	1100
70	409	630	1140	1380	180	6/4"	840	590	170	620	1090	1280
90	431	680	1140	1380	200	2"	840	640	170	620	1090	1280
110	471	680	1240	1380	200	2"	940	640	170	620	1090	1280

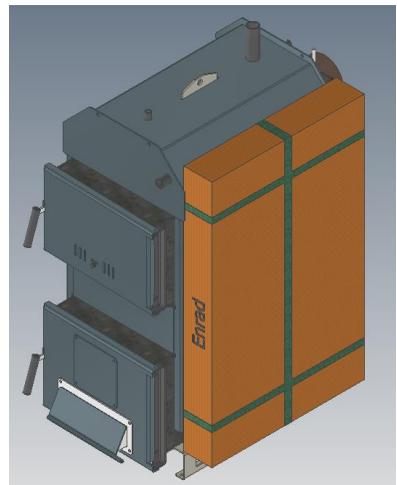
2. TECHNICAL DATA

Type:		20	25	30	35	40	50	70	90	110
Power range	kW	15-20	20-25	25-30	30-35	35-40	40-50	50-70	70-90	90-110
Chimney draft	Pa	16	18	19	20	21	23	26	30	34
Water content	l	75	80	90	96	106	120	150	160	180
Flou gas temp. wood	°C	184	190	189	193	195	204	208	215	220
Working temperature	°C	60-90	60-90	60-90	60-90	60-90	60-90	60-90	60-90	60-90
Moisture content-wood	%	10 max. 20								
Pellet size		Ø6, L= max .50 mm								
Burning chamber volume	l	96	104	121	140	153	175	276	305	342
Wood chamber volume	l	78	85	98	112	125	138	216	250	282
Chamber door	mm	250/ 320	250/ 320	250/ 370	250/ 420	250/ 420	250/ 470	310/ 490	310/ 540	310/ 540
Wood logs l-max	mm	400	500	500	500	500	500	600	600	700
Chimney height	m	7-8	7-8	7-8	8-9	9-10	10-12	12-14	14-16	14-16
Safety heat exchanger tube	1/2	L= 1600-2500 mm								
Working pressure	bar	2.5								

The stated data on the nominal power of the boiler are in accordance with EN 303-5 for the average calorific value of fuel parameters 17000-20000 KJ/kg, and moisture content-wood (10-20%).

3. TRANSPORT AND STORAGE

- The boiler is transported together with a cardboard box containing an outer formwork with thermal insulation and cleaning accessories;
- The boiler must always be in a vertical position;
- It is strictly forbidden to stack one boiler on top of another
- Caution that turning the boiler during transport is a serious risk of damage;
- The boiler should only be stored indoors and in a dry place, so that the humidity in the room must not exceed a critical value of 80%.
- When unpacking the boiler, check whether the cover plate or the boiler is scratched;



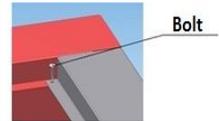
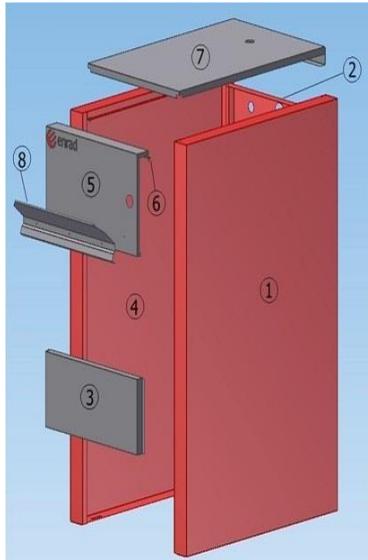
4. BOILER MOUNTING AND PLACEMENT

Installation and mounting of the boiler must be performed by a professional. The boiler must be placed on a solid and horizontal surface. We recommend that it be placed on a concrete base 60 to 100 mm high.

The boiler room must be frost-free and well ventilated. The connection of the boiler to the chimney can be performed correctly, and in one it is possible to operate the boiler, monitoring during operation, boiler cleaning and maintenance.

The assembly of the boiler KE 20-110 KW, is performed according to the assembly sketch (next scheme), which is packed with the boiler framework.

Procedure for dismantled the Boiler ECO-KE 20-50-110 kW as in the photo.



1. Side cover
2. Back side cover
3. Front side cover
4. Side cover
5. Front side cover
6. Hole for bolt
7. Upper side cover
8. Protective cover

4.1 BOILER ROOM

The boiler room should have good ventilation. The required area of the ventilation opening is given by the following equation:

$$S (\text{cm}^2) = 6.02 * Q (\text{KW})$$

Where Q is the rated power of the boiler in KW.

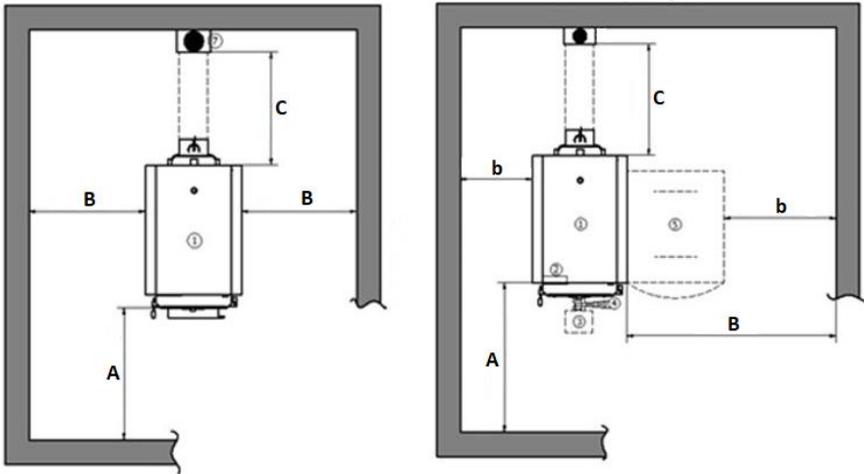
Distance from the front wall:

For boilers up to 110 KW	- minimum	A-1.5 m
For boilers bigger than 110 kW	- minimum	A-2 m

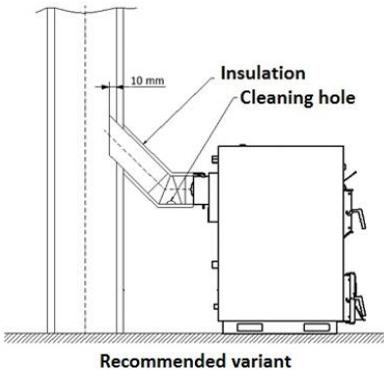
Distance from the rear wall

- minimum	C- 1
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The mounting distance of the boiler.



5. CONECTING TO THE CHIMNEY



Scheme 3

The picture on the left and right shows the optimal way of connecting the boiler to the chimney. The connecting arch should be as smooth as possible and again have a slight rise from the boiler to the chimney. It is also possible to connect shown on the right, where the maximum number of allowed arcs is two. Be sure to insulate the flue PIPE.

5.1 CHIMNEY

The chimney installation must supply sufficient draught, air tightness and protection against condensation.

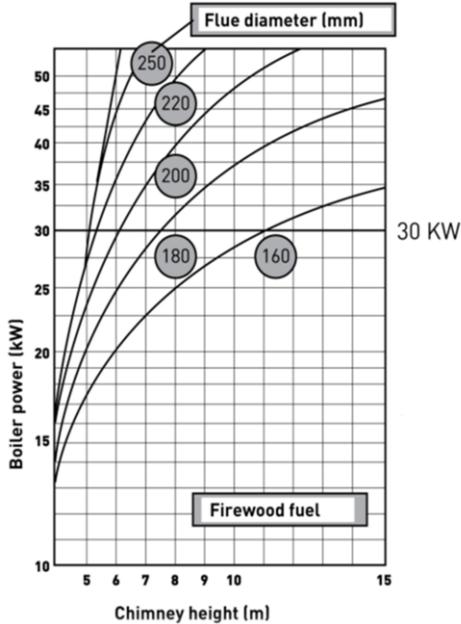
The appropriate chimney installation is very important for the boiler's efficient and safe function!

The chimney must be positioned, if possible, in the interior of the building. It must be vertical, with no changes in the direction.

The cross-section of the chimney can be round or rectangular. If the chimney is installed in the exterior, it must be insulated.

The chimney must be equipped with a cleaning door at its base. Also cleaning doors are recommended where there are changes in direction and ash can be accumulated.

Tactical cleaning is recommended (every 3 months) for efficient boiler function.



Each boiler should be connected to an independent chimney.

Connection of multiple boilers to the same chimney is not recommended.

6. BOILER INSTALLATION IN THE HEATING SYSTEM

The ECO-KE boiler can be installed in closed or open central heating systems. In both cases, the boiler can be fired with solid fuel, wood pellets or oil or gas. Installation must be carried out in accordance with technical standards, by a professional who assumes responsibility for the proper operation of the boiler. Before putting the boiler into operation, rinse the system thoroughly from impurities remaining after installation. The connection of the boiler to the central heating system is performed by means of a Dutchman, not by welding.

Boiler filling and installation with water.

Water filling of the boiler and installation is performed by means of a filling tap mounted on the inlet connection of the boiler.

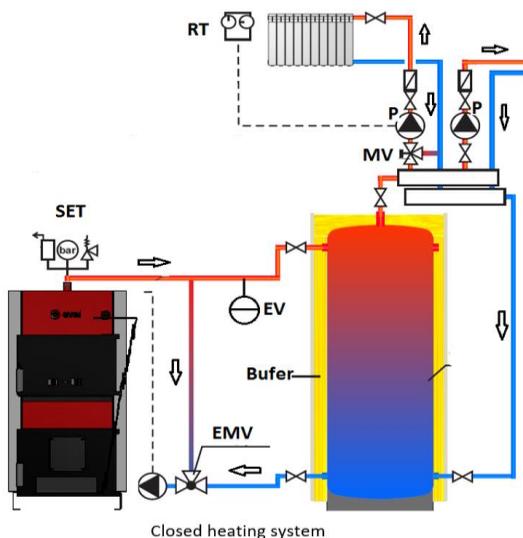
When filling the boiler and installation with water, take care of venting them.

With a closed heating system, after charging the system from 1.5 to 2 bar, the installation is air venting by an automatic valve located at the highest point of the system.

With an open system, the operating pressure depends on the height of the building and the position of the open expansion vessel (1 bar = 10 m).

7. BOILER INSTALLATION - CLOSED HEATING SYSTEM

- With a closed heating system, the installation of a certified safety valve with an opening threshold of 2.5 bar and a diaphragm expansion vessel is mandatory.
- It is also necessary that the system has a thermometer and a manometer.
- Safety valve and expansion vessel must be installed according to the rules of the trade and there must be no locking element between them and the boiler.
- It is recommended to install dirt traps-filter on the return line.
- When burning solid fuel according to EN standards, be sure to install a safety valve.
- The safety valve must be installed in the immediate vicinity of the boiler, the connecting line must be as short as possible and must not be able to close.
- The closed expansion vessel must be positioned so that the membranes are in a horizontal position. The volume of the closed vessel is determined on the basis of the boiler capacity, the ratio is 1 KW: 1
- The volume of the pan should be increased by 10% of the boiler capacity.



THERMAL PROTECTION OF THE BOILER

(Closed systems)

System with wood-fired boiler

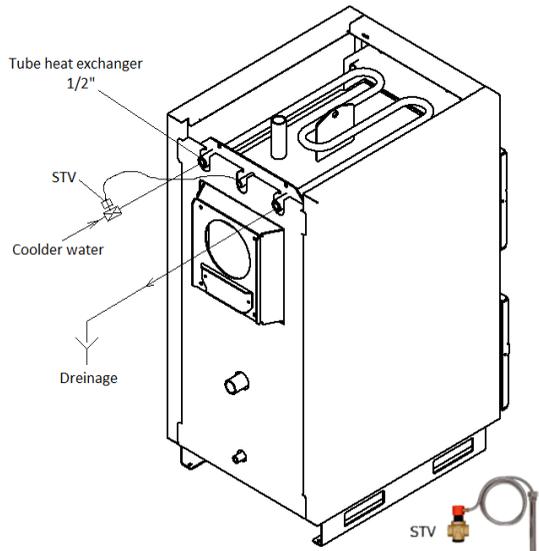
It is obligatory to install a safety thermal valve in the system.

ECO-KE the boiler has corresponding tube $\frac{1}{2}$ " exchanger to which a safety Thermal Relief Valve (STV) is connected.

Description of system parts:

- Safety thermal valve STV
- Inlet of cold water through the thermo valve into tube exchanger through the boiler
- Hot water outlet from the heated exchanger into the sewer;
- Thermo valve sonde;

In case the safety thermal valve is not installed during the installation of the boiler, the entire responsibility and the damage are borne by the installer, the contractor and the warranty in this case does not apply.



The method of installing thermal protection is given with the instruction with thermal valve type and its warranty (CALEFFI, DBV, COMAP... etc.)

Important:

- Thermal protection must be connected to the plumbing and not from the hydrophore.
- Namely, in the event of a power failure, there is a possibility of the boiler overheating, and the hydrophore is then unable to supply water.

8. BOILER INSTALLATION - OPEN HEATING SYSTEM

- With an open heating system, the safety distribution line of the expansion vessel, the boiler valve are installed on the supply line, while the safety line of the expansion vessel, the boiler valve, the pump, the pump valve are placed on the return line of the system.

- The sketch also shows the installation method and the mixed valve.

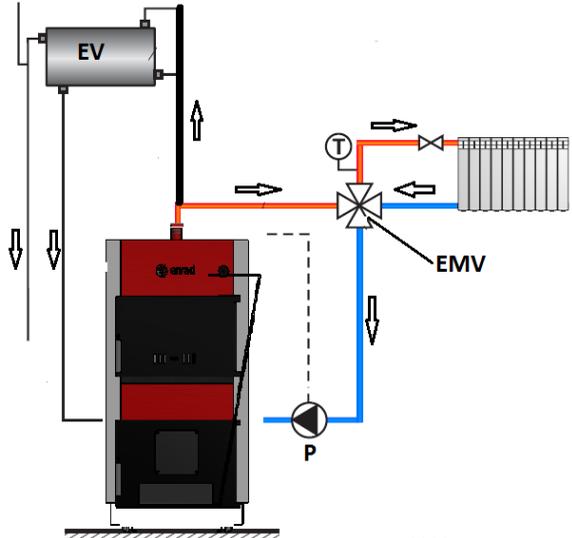
- Immediately below the open expansion vessel (up to 10 mm) a short connection is placed between the safety return line and the vessel, so that freezing does not occur in winter and only when the boiler is running.

- No fittings must be installed on the safety distribution and return lines.

- The volume of the expansion vessel is determined according to the following equation: $V = 0.07 * V (l)$

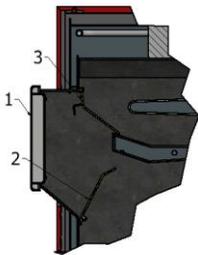
- Where $V (l)$ is the volume of water in the system. The diameter of the safety manifold and return pipe is calculated, the recommendation is not less than 25 mm.

- The open expansion vessel is placed vertically above the highest point in the system, they must also be insulated and protected from freezing.



9. FIRING WITH SOLID FUEL

- Open the upper boiler door (scheme 9, pos.1) and open the valve pos.5
- Place logs of wood or charcoal and crumpled paper on the cleaned tubes.
- Close the lower flap (diagram 9, item 5) then close the upper door.
- Open the lower boiler door and grille and ignite the paper.
- Close the grille and then the lower door.
- Fully open the primary air damper on the lower door.
- Before starting, place the draft regulator in the maximum position and tie it with a chain
- After the wood or coal burns in the firebox, fill the firebox with wood or coal.
- When the fire starts, the draft regulator is placed in the desired temperature position and the chain is attached to the damper at the lower boiler door.
- It is necessary to adjust the draft regulator so that the temperature in the boiler during normal operation does not exceed 85-90 C, and does not fall below the temperature of 60 C.
- In the event of a power failure and shutdown of the circulation pump, the air supply to the furnace should be closed, the chimney damper closed, and if necessary, the fire should be thrown out.
- Filling the installation with water is done when the boiler is in a cold state. Water hardness should not be higher than recommended.
- It is mandatory to clean the boiler regularly and at the end of the heating season and coat it with anticorrosion protection, thus extending the service life.



1. Upper door
2. Closing plate remove (open when loading the fuel)
3. Closing plate remove by hand when made cleaning)

10. ECO VKE BOILER (Fan Assisted Combustion)

High Efficiency. Manual loading. Fan speed modulation control. Sophisticated energy saving and safety features. Suitable for firing wood logs, coal, and lignite. Easy loading and boiler cleaning due to property sized front doors. Room thermostat option.

Auto switch-off when there is no fuel.
Night and ECO modes to save energy.

Automatic regulation of the boiler is performed via the control panel and a fan mounted on the lower door of the boiler. Programming and commissioning of the boiler is performed only by an authorized service or technician,

For additional mandatory compliance with the technical instructions of the control panel and fans by its manufacturers.



Starting the boiler

To correctly start up the ENRAD boiler follow the next steps:

Make sure the control panel switch is set to OFF and that **fan** does not function. Make sure the chimney damper is positioned in vertical position (**completely open**).

Open the middle door (fire chamber) and introduce a sufficient amount of small and thinpieces of wood.

Using sheets of thin paper light, the wood placed inside the boiler.

Close the door of the boiler.

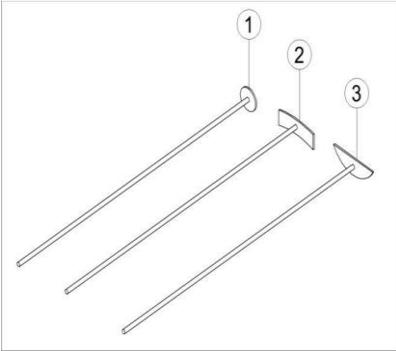
Wait several minutes until the flame develops and produces some embeds.

After formation of embeds, load the fire chamber with wood. Position them on top of thegrate.

Close the door and secure it with the handles.

Turn on the general switch of the control panel and set the required temperature - **Fan begins operation**.

11. BOILER CLEANING AND MENTENANCE



Solid fuel boiler require regular cleaning in order to function properly and efficient. **Cleaning must be effected at least once a week.** The boiler is equipped with cleaning tools.

It is recommended that the boiler is cleaned from ash daily. A detailed cleaning of the boiler should be done permanent, once a month and also when the heating season ends.

Regular maintenance extends the service life of the boiler. Cleaning is to be done outside the tubes, walls, through upper and lower door of the boiler but also using the opening on the back side.

12. WARRANTY CONDITIONS

The product warranty is valid for a legally defined period.

The manufacturer's warranty period applies to electronic and electrical parts.

Guaranteed service time is in which we guarantee service, accessories and spare parts, starting from the day of purchase of the device. The warranty does not apply to glass, glass-ceramic hob and physical damage caused after purchase.

THE MANUFACTURER RESERVES ALL CHANGE RIGHTS

The appliance will only function properly during the warranty period if it is used in accordance with these instructions for connection and use.

The warranty expires if it is determined that:

- Connection of the product or repair was performed by an unauthorized person, or if non-original parts were installed;
- If the appliance has not been used correctly in accordance with these instructions;
- If the appliance has been mechanically damaged during use;
- If the repairs were performed by an unauthorized person;
- If the appliance has been used for commercial purposes;
- If the damage occurred during transport after the sale of the appliance
- If malfunctions have occurred due to improper installation, improper maintenance or mechanical damage by the customer;

