benekov

SERVICE AND INSTALLATION MANUAL FOR CENTRAL HEATING BOILER

BENEKOV R16

BENEKOV R26

BENEKOV R51

Dear customer,

thank you for the decision to purchase an automatic boiler from the BENEKOV R series and the confidence in the products manufactured by the company BENEKOVterm s.r.o., Horní Benešov.

To get used to handling your new product correctly right from the beginning, please read this service manual at first. Please focus your attention especially on chapters 7 and 8. You are kindly requested to follow the instructions mentioned bellow and to follow the information from the producer and from the service company that installed the boiler.

These boilers have been approved for operation within the EU by the Engineering Test Institute, s.p. notified person ES 1015, authorized person 202, Brno, certificate no. B-30-00311-14 from 30.4.2014.

In accordence with the Government Order no. 176/2008 Coll., appendix 1, art. 1.7.4, this is the
ORIGINAL SERVICE AND INSTALLATION MANUAL.

Content: page

1. Description and advantages of the boiler

Use of the boiler:

The central heating boiler BENEKOV R16 is designed for heating of small or low-energy family houses, cottages and other buildings with the top heat input not higher than 20 kW.

The central heating boiler BENEKOV R26 is primarily designed for heating of medium-sized objects – stores, schools, recreation facilities, large- sized family houses and other building with the top heat input not higher than 26 kW.

The BENEKOV R51 hot water boiler is designed for heating of mid-sized structures – shops, school buildings, recreational facilities, large family houses, office buildings, business premises and others, where a 49 KW heating capacity is sufficient.

Advantages of the boiler:

- automatic operating of the boiler
- possibility to burn renewable energy source in form of wooden pell
- solid fuel is supplied mechanically from the fuel container directly to the combustion chamber
- automatical cleaning of the heat transfer surfaces
- simple, time-unassuming attendance and maintenance
- low operation costs
- 3 draught heat exchanger construction that enables high efficiency
- low emission load for the environment
- automatic ignition included in the basic version
- controlled burning with the help of the lambda probe
- heat input modulation in whole power range .
- option of connecting additive dispenser
- possibility to annex ash removing device
- up to date design

2. Technical data

Table 1: Proportions and technical data of the boilers

Boiler type		**BENEKOV R16**	**BENEKOV R26**	**BENEKOV R51**
Weight	kg	375	445	735
Water capacity	dm^3	62	89	175
Chimney diameter	mm	145		195
Heat transfer surface	m^2	1,90	2,84	5,64
Fuel container capacity	dm^3	250		430
Boiler dimensions: width x depth x height	mm	1163 x 1108 x 1499		1448 x 1493 x 1719
Size of the fuel container filling gap	mm	500 x 339		580 x 417

Class of boiler acc. ČSN EN 303-5		5		
Working water ovepressure	bar (kPa)	2,0 (200)		
Tested water overpressure	bar (kPa)	4,0 (400)		
Recommended working temperature of heating water	°C	65 - 80		
Lowest temperature of incoming water	°C	62		
Hydraulic loss of the boiler ∆ T = 10 K	mbar	4	16	8
∆ T = 20 K	mbar	1,6	4	2
Noise level	dB (A)	54,7 ± 3,2		
Chimney draught	mbar	0,12 – 0,15	0,15 – 0,20	0,20 – 0,25
Boiler conectors heating water	Js	G 1”		G 6/4”
return water	Js	G 1”		G 6/4”
Connecting voltage		1 PEN 230 V / 16 A / ~ 50 Hz, TN-S		
Electric input at nominal power	W	33	38	51
Electric input at minimal power	W	15	15	23
Electric input at STAND BY mode	W	6	6	6
Maximal electric input	W	1766	1794	1792
Electric protection		IP 20		

Table 2: Thermal and technical data of the boilers BENEKOV R for burning wooden pellets

Boiler type		**BENEKOV R16**	**BENEKOV R26**	**BENEKOV R51**
Nominal power	kW	20	26	49
Adjustable power	kW	6 – 20	7,7 – 26	14,6 - 49
Fuel consumption	kg . h^{-1}	1,3 – 4,3	1,8 – 5,7	3,1 – 10,5
Power at STAND BY mode	kW	1,7	1,7	1,7
Fuel consumption at STAND BY mode	kg . h^{-1}	0,4	0,4	0,4
Burning length at specified power and full container	h	54	27	25

Exhaust gas temperature - at the nominal power - at the minimum power	 °C °C	 108 73	 109 69	 95 61
Efficiency	%	92,1	90,8	90,7
Mass flow rate of exhaust gas at the output - at the nominal power - at the minimum power	 $kg . s^{-1}$ $kg . s^{-1}$	 0,008 0,004	 0,016 0,006	 0,024 0,011

3. Approved fuel for the boiler

The approved (guarantee) fuel for the BENEKOV boilers is stated in the table 4.

Table 4: Approved Fuel

Type of fuel	Diameter [mm]	Length [mm]	Strewn weight [kg/m^3]	Water content [%]	Ash content [%]	Heating value [$ML.kg^{-1}$]
Wooden pellets	ϕ 6-14	max. 30	600–650	max. 12	max. 1,5	min. 17

Warning! Poor quality of fuel could influence in a negative way the efficiency and emission characteristics of the boiler.

The pellets must fulfil of norm ČSN EN 14961-2

4. Description of the boiler

4.1 Construction of the boiler

The construction of the boiler corresponds to the standards and requirements of:
ČSN EN 303-5:2013 - Central heating boilers – part 5: Central heating boilers for solid fuel with manual or automatic supply of fuel with the highest nominal power 500 kW - terminology, requirements, proofing and marking.

The main part of the boiler that is based on the principle of lower feeding of fuel is the boiler body welded from the steel plates. All parts of the boiler body, especially the exhaust and heating water sections are welded from 5 mm steel plates. In the front part of the boiler body there is a combustion chamber fitted with a burner, in the back there is a lamella heat exchanger. In this device, the heat from the exhaust gas is

transferred to the heating water. The boiler is equipped with a cleaner which makes it possible to regularly clean the heat exchanger automatically.

The burner is based on the principle of lower feeding and consists of a worm fuel feeder and a cast-iron grate. The fuel conveyed consists of a fuel feeding channel, and a pipe for supply of burning air. Both channels are connected by a flexible piece that serves to balancing the pressure uner the fire place and prevents the smoke from penetrating back to the fuel container during the burning process.
A ceramic reflector is installed over the burner. This catalyser regulates the exhaust gas stream, reduces the dust nuisance and ensures complete and clean burning of fuel.

Under the combusting chamber, an ash box and bedding for optional assembly of the deashing device are installed.

Next to the boiler, the fuel container is situated which joins through the turnstile the worm conveyor. Depending on the position of the container the boiler is produced in two variants.

- **Right-handed version** - the container is situated on the right side of the boiler (from the front view)
- **Left-handed version** - the container is situated on the left side of the boiler (from the front view)

At the back side of the fuel container there is an emergency extinguishing system leading into the worm feeder.

The combustion air ventilator is placed in front of the fuel container and is joined on the fuel feeder. The air quantity is regulated by the instruction control unit of the boiler.

Both the heating water input and output to be connected to the heating system are situated on the rear side of the boiler. There are two outlets with either a G 1“ (BENEKOV R16 and R26) or G 6/4“ (BENEKOV R51) inner thread. The outlet with the G 1/2“ thread on the lower right side is intended for the installation of a drain tap. There is a smoke extension piece on the upper rear side of the boiler for the discharge of combustion products into a chimney.

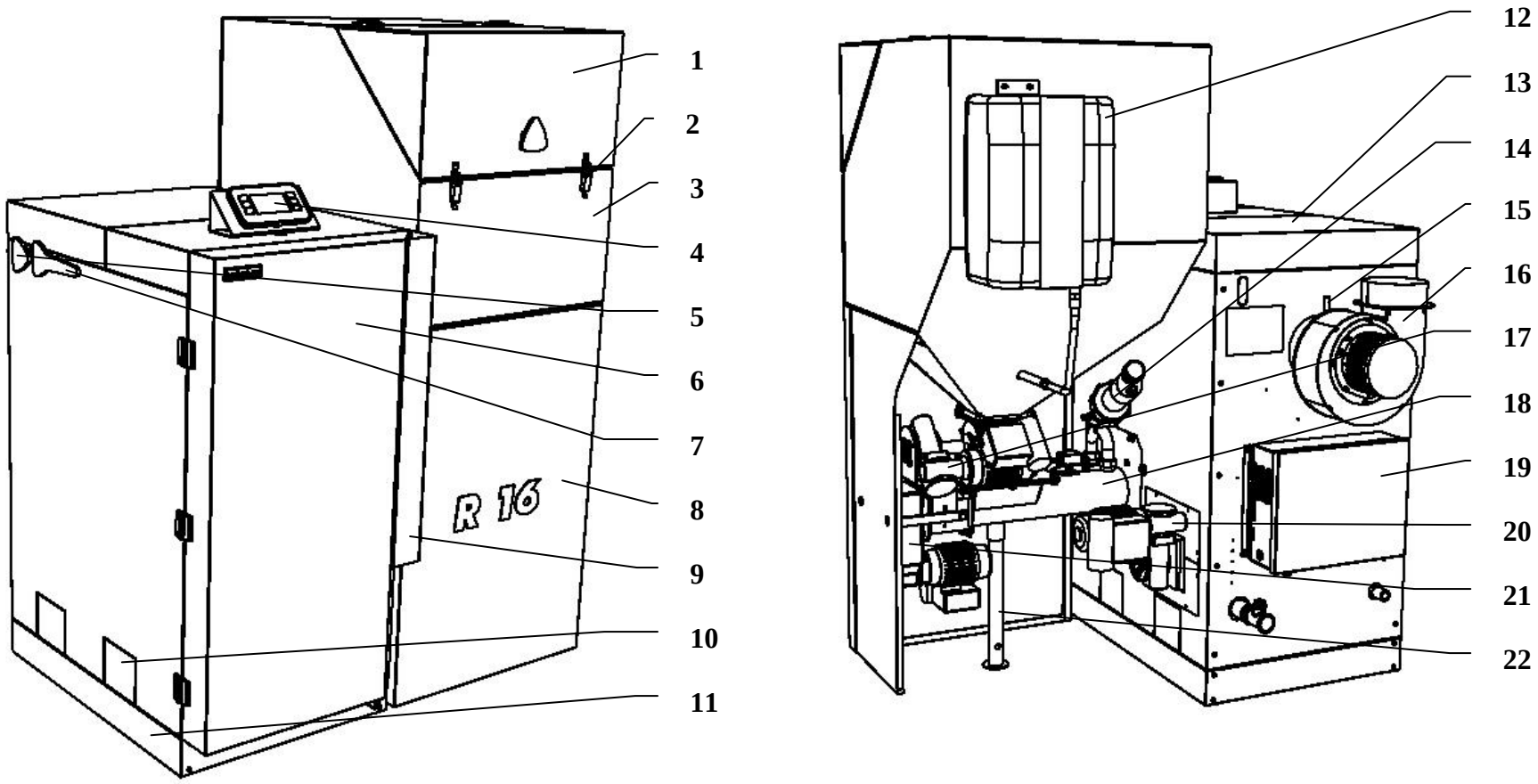
The smoke outlet for the combustion products enhances the chimney draught and belongs to the necessary boiler equipment.

Moreover, the boiler is equipped with automatic ignition in the basic version. The automatic ignition system is located on the boiler side under the fuel container and consists of a hot air syringe and a heat-resistant nozzle which opens directly into the burner.

All the necessary parts of the boiler like the boiler's body, the cover and the fire-box door are isolated with an isolation material with no detrimental effects on the health. This isolation diminishes the loss due to heat interchange.

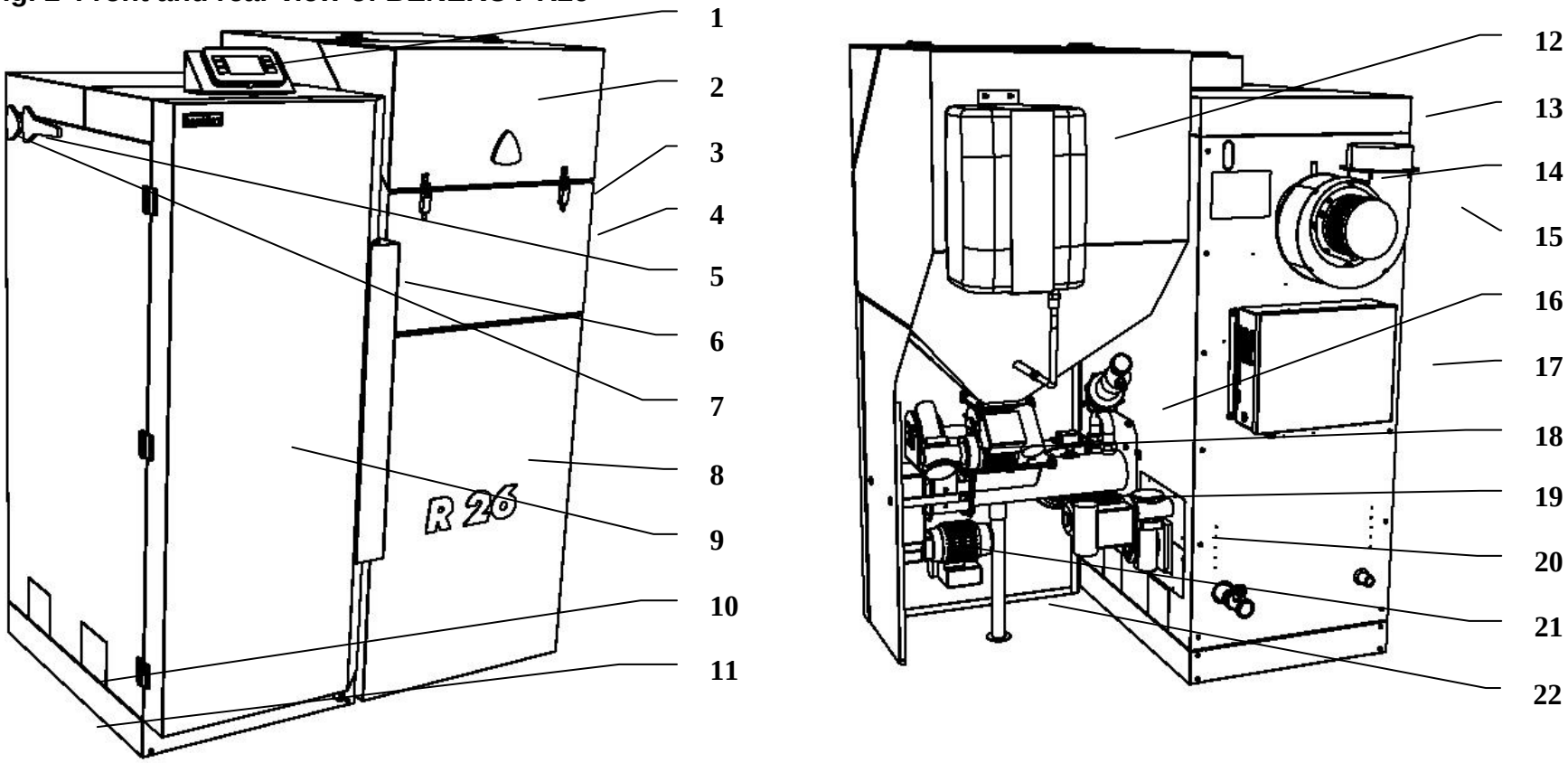
The steel plates are coloured with high quality comaxit paint.

Fig. 1: Front and rear view of BENEKOV R16



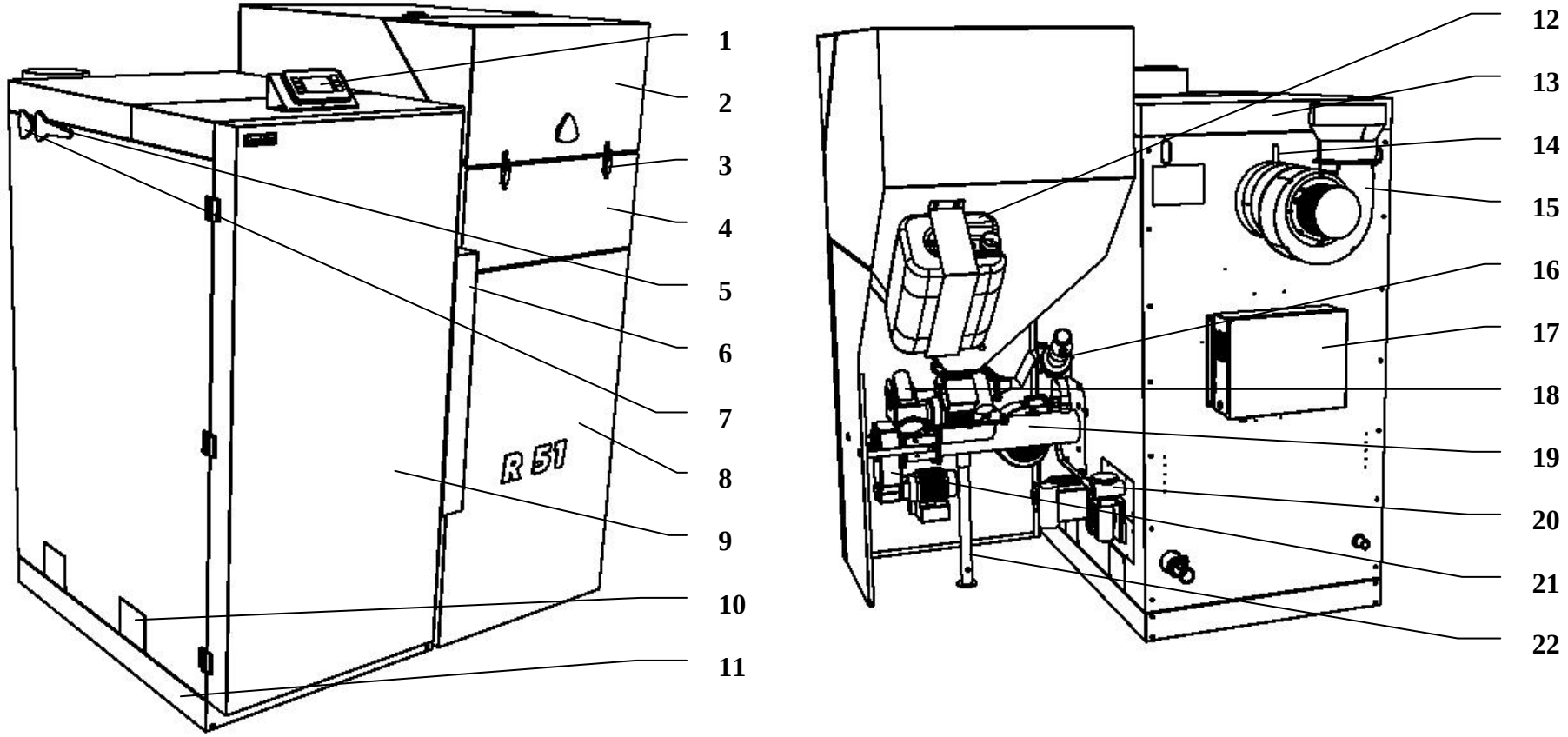
1. fuel container cover
2. fuel container lock
3. fuel container
4. display of control unit
5. firing flap lock
6. cover of the door
7. firing flap handle
8. cover of feeder of the fuel
9. handle of cover of the door
10. ash remover preparation
11. cover of the boiler body legs
12. entinguishing safety system
13. cover of the cleaning of boiler body
14. automatic ignition
15. lambda probe
16. exhaust sucking fan
17. turnstile engine
18. screw feeder of the fuel
19. el. switchboard of control unit
20. engine of automatic cleaning
21. engine of feeder of the fuel
22. leg

Fig. 2 Front and rear view of BENEKOV R26



1. diplay of control unit
2. fuel container cover
3. fuel container lock
4. fuel container
5. firing flap handle
6. handle of cover of the door
7. firing flap lock
8. cover of feeder of the fuel
9. cover of the door
10. ash remover preparation
11. cover of boiler body legs
12. extinguishing safety systém
13. cover of cleaning of boiler body
14. lambda probe
15. exhaust sucking fan
16. automatic ignition
17. el. switchboard of control unit
18. turnstile engine
19. screw feeder of the fuel
20. engine of automatic clearing
21. engine of feeder of the fuel
22. leg

Fig. 3 Front and rear view of BENEKOV R51



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12. extinguishing safety system
13. cover of cleaning of boiler body
14. lambda probe
15. exhaust sucking fan
16. automatic ignition
17. el. switchboard of control unit
18. turnstile engine
19. screw feeder of the fuel
20. engine of automatic clearing
21. engine of feeder of the fuel
22. leg

Fig. 4: basic dimensions of BENEKOV R16

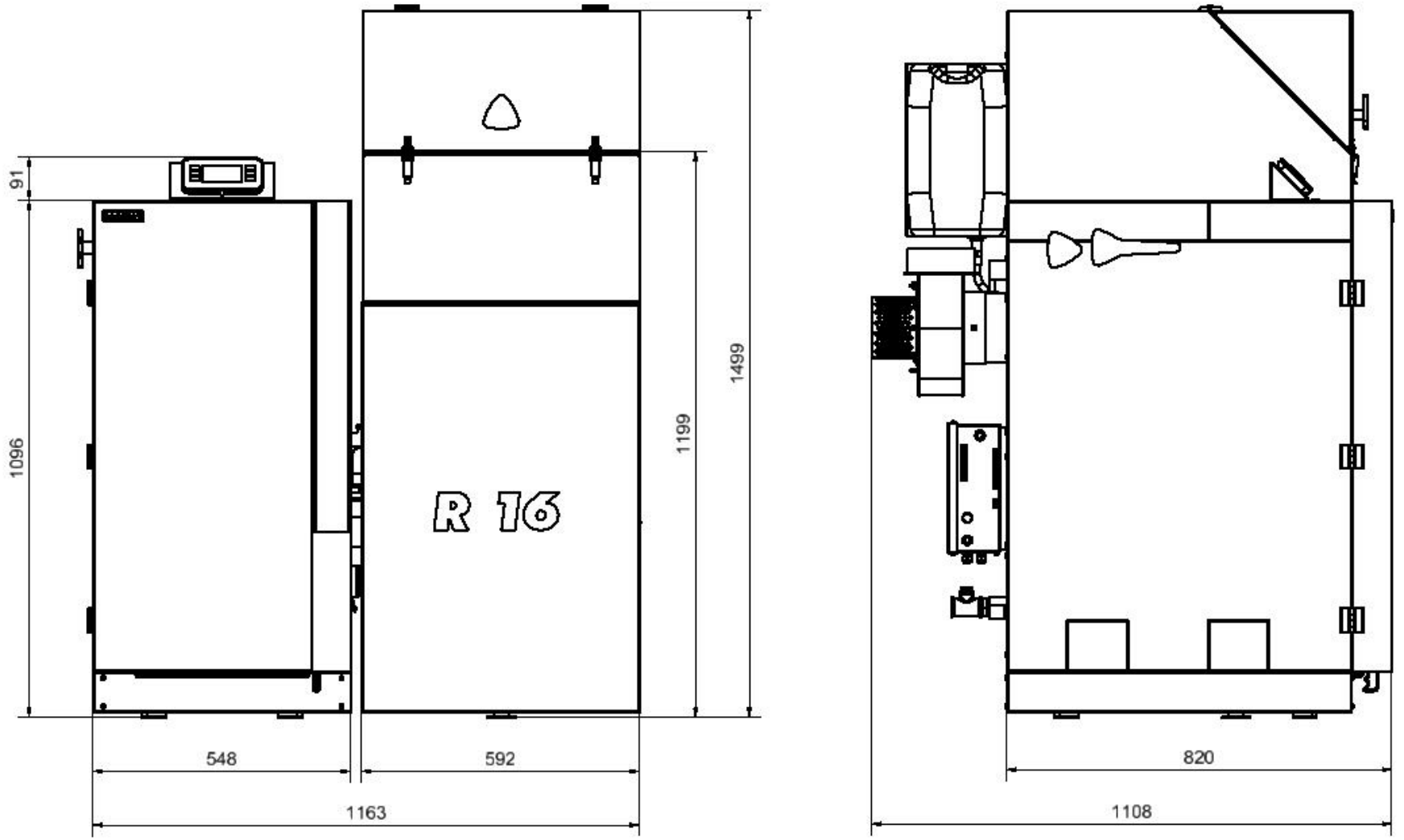


Fig. 5: Basic dimensions of the BENEKOVR26

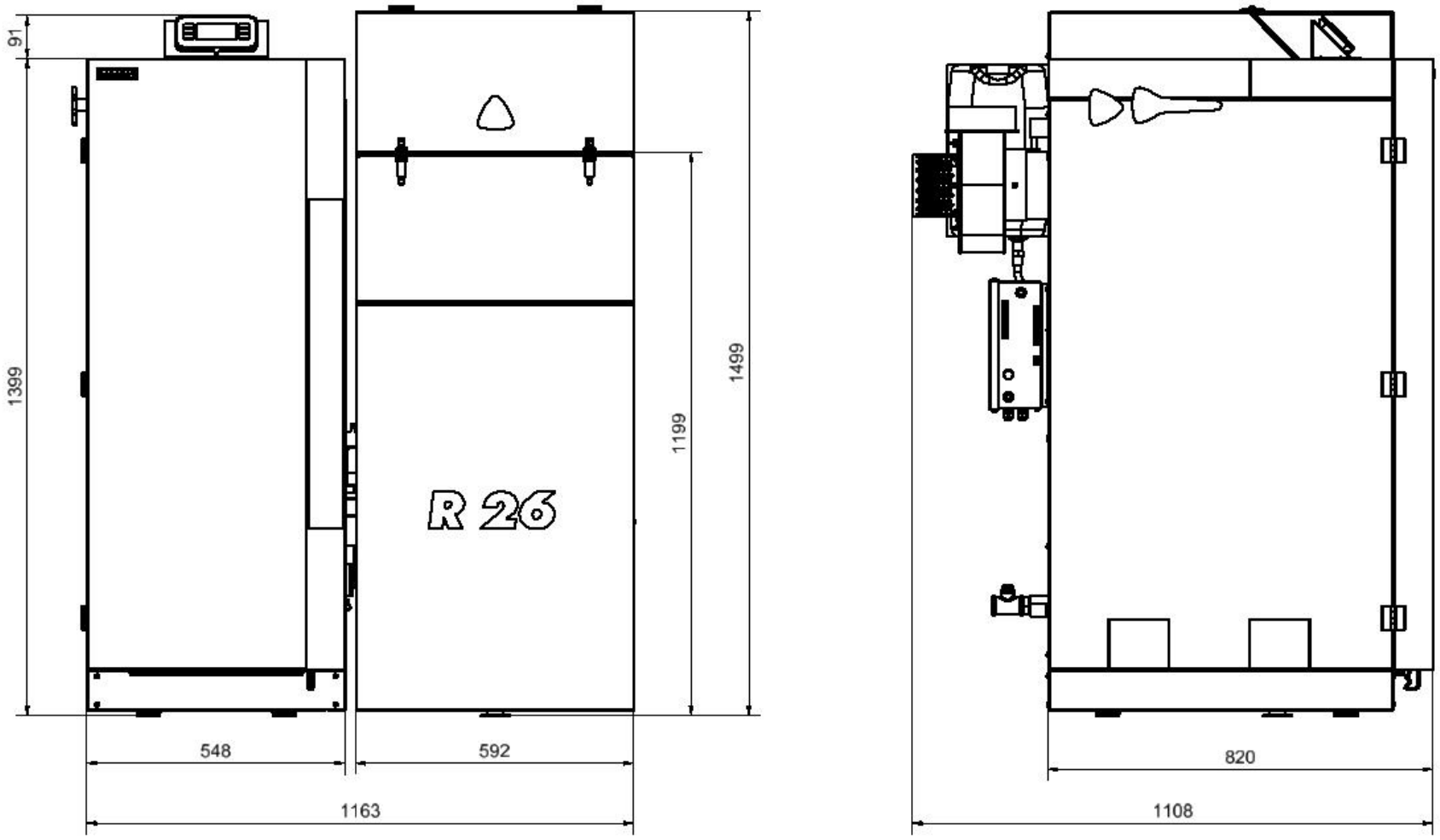
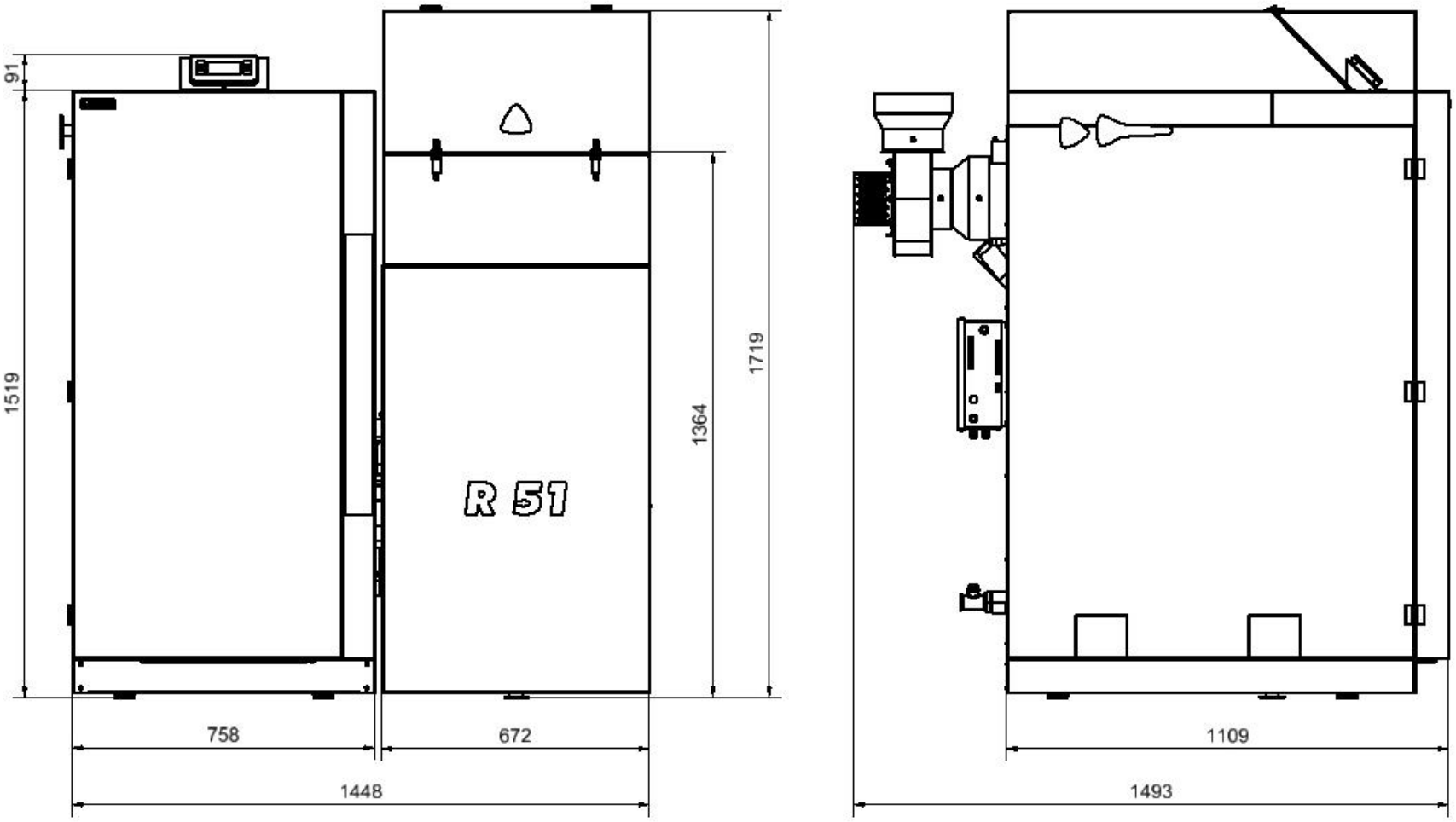


Fig. 6: Basic dimensions of BENEKOV R51



4.2. Control, regulating and security devices

The control and regulation of the boiler is ensured by the **instruction control unit -** see separate service instructions.

Security elements that control the safe boiler running:

- **Safety thermo regulator (safety switch)** is used to prevent the heating system from overheating. The safety switch is set from the producer to the top temperature 95°C, i.e. to a higher temperature than the possible requested temperature at the boiler.The safety thermo regulator is located under the front panel on the console behind the instruction control unit.
- **Thermal overload (motor protection)** is a part of the fuel feeding device drive and ensures the protection against burn off especially in the case when the feed device is blocked. This element also disconnects the ventilator to prevent the fire penetration to the container. During the **regular operation, the temperature of the engine can reach 85°C** - such a temperature is not a sign of breakdown.
- **Turnstile** is a device that mechanically separates the fuel in the container from the fuel in the worm feeder. This technical solution ensures that if the fuel in the worm feeder device burns up, there is no chance that the fire could expand in the fuel container (especially in the case of long time power cut).
- **Limit switch of the fuel container cover serves** for the shut - down of the worm feeder and the ventilator when the fuel container cover is opened. This prevents running of the boiler when the fuel container cover is opened. After correct closing of the cover the boiler is set up for further use.
- **Emergency extinguishing system** is noother security element that prevents the burn up of the fuel back into the fuel container. When the temperature at the bottom of the fuel container rises over 95°C the thermostatic valve is opened and the bottom of fuel container is filled with water form the water supply system or from the installed water pressure tank.
- **Firing flap** is placed among the second and third draught of the boiler in the upper part of the lamella exchanger and enables to regulate the temperature exiting exhausts.
  During the boiler operation, when the temperature of exhausts raises over 100°C the firing flap must be closed, i.e. the cleaner and firing flap adjusting handle on the side of the boiler must be turned in the downward direction (towards the rear) and secured by means of the locking screw with plastic head.
  By firing (cold chimney) or during the long time minor load of the boiler it is recommended to operate the boiler with the firing flap partly open to prevent the exhaust temperature drop below 80°C. In this case it is necessary to turn the cleaner and ignition handle in the upper direction (towards you) and secure by means of the locking screw with plastic head.

4.3. Accessories

Standard accessories:

- Instruction and operation manual, the certificate of warranty is included
- Instruction and operating manual for the instruction control unit
- List of service centers
- Ashtray
- Cleaning fire hook
- Automatical cleaning of heat transfer surfaces of the heat exchanger
- Emergency fire extinguishing system in form of a paraffin cap
- Combustion products extract
- Automatic ignition
- Cover metal sheets of the fuel feeder

Accessories available on request:

- Deashing device 40l, 80l, 200l
- Emergency fire extinguishing system in form of a thermostatic valve with a pressure vessel
- Turning fire grate for combustion of lower-quality fuel

These accessories are not included in the standing charge of the boiler

5. Placing and installation of the boiler

5.1. Regulations and guidelines

The heating boiler may be installed only by the authorized service company that has the certificate for assembly of these devices. The project of the system according to valid regulations must be prepared.

The heating system must be filled with water that matches the standard ČSN 077401:1992. Especially the water hardness shouldn't run over the required parameters.

Fig. 5: Parameters of the heating water

Parameter	Unit	Value
Hardness	mmol/1	1
Ca^{2+}	mmol/l	0,3
Total Fe + Mn concentration	mg/l	0,3 (recommended value)

a) regulations concerning the heating system

ČSN EN 303-5:2013 Central heating boilers - part 5: Central heating boilers for solid fuel with manual or automatic supply of fuel with the highest nominal power 500kW - terminology, requirements, proofing and marking.

ČSN 06 0310: 2006	Heatning systems in buildings - projects and installation.
ČSN 06 0830: 2006	Heatning systems in buildings - safety devices
ČSN 07 7401: 1992	Water and steam in thermal energetic devices operating with the running pressure to 8Mpa.

b) <u>regulations concerning the chimney</u>

ČSN 73 4201:2010	Chimneys and smoke flues – projects, realization and connection of fuel appliances.

c) <u>regulations concerning the fire regulations</u>

ČSN 06 1008:1997	Fire safety of heat installations.
ČSN EN 13 501-1-1+A1:2010	Fire safety classification of construction products and buildings constructions – Part 1: Classification according to results of reaction to fire tests

d) <u>regulations concerning the electrical power network</u>

ČSN 33 0165:1992	Electric regulations. Marking of the conductors by colours or numbers. Implementary regulations.
ČSN 33 1500:1990	Electric regulations. Revision of the electric appliances.
ČSN 33 2000-1 ed.2:2009	Low voltage electric installations. Part 1: Basic principles, determination of basic characteristics, definition.
ČSN 33 2000-4-41 ed.2:2007	Low voltage electric installations - Part 4-41: Protection measures to ensure safety – Protection from electrical injury.
ČSN 33 2000-5-51 ed.2:2006	Buildings electrical instalations – Part 5-51: Choosing and building of the electrical appliances – General principles
ČSN 33 2000-7-701 ed.2:2007	Low voltage electric installations – Part 7-701: Single-purpose appliances and appliances in specific buildings – Spaces with a bath or a shower
ČSN 33 2030:2004	Electrostatics - Protection from the dangerous effects of the static electricity.
ČSN 33 2130 ed.2:2009	Low voltage eletric instalations. Internal distribution of the electric power.
ČSN 33 2180:1979	Electric regulations of ČSN. Connection of the electric devices and appliances.
ČSN 33 2350: 1982	Electric regulations. Regulations for electrical devices in complicated climatic conditions.
ČSN 34 0350 ed.2:2009	Electrotechnic regulations. Regulations for the movable cables and for cables.

ČSN EN 55 014-1 ed.3:2007 Eletromagnetic compatibility – Requirements for appliences for households, electrical gadgets and similar equipment – Part 1: Emissions

ČSN EN 55 014-2 :1998 Eletromagnetic compatibility – Requirements for appliences for households, electrical gadgets and similar equipment – Part 2: Resistance – Product group related standards

ČSN EN 60079-14 ed.3:2009 Explosive atmospheres - Part 14: Project, choice and realization of electrical installations

ČSN EN 60335-1 ed.2:2003 Electrical appliances for household and similar purposes - Safety - Part 1: General requirements

ČSN EN 60335-2-102:2007 Electrical appliances for household and similar purposes – Safety - Part 2-102: Special requirements concerning appliances for combustion of gas, oil or solid fuel equipped with electrical connections

ČSN EN 60445 ed.3:2007 Basic safety principles for the human-machine interface, marking and identification – Marking the appliance terminals and conductor ends

ČSN EN 60445 ed.4:2011 Basic safety principles for the human-machine interface, marking and identification – Marking the conductors with colours or letters and numbers

ČSN EN 61000-3-2 ed.3:2006 Electromagnetic compatibility (EMC) - Partt 3-2: Limits – Limits for emmisions of harmonic current (apliences with input phase power <= 16 A)

ČSN EN 61000-3-3 ed.2:2009 Electromagnetic compatibility (EMC) - Part 3-3: Limits – Limiting the voltage changes, voltage fluctuation and flicker in distribution networks for appliances with rated phase curent <=16 A which is not a subject of a conditional connection

E) <u>regulations concerning noise</u>

ČSN EN ISO 3746:2011 Acoustics – Determining of levels of acoustic output and levels of acoustic energy of noise sources using acoustic pressure – Operating method with measuring cover area above the reflecting plane

ČSN EN ISO 11202:2010 Acoustic – Noise emitted by machines and appliances – Determining the levels of emitted acoustic pressure on the operator post and other defined places using approximate environment corrections

F) <u>concerning machinery</u>

ČSN EN 614-1+A1:2009 Machinery safety – Ergonomic principles of projecting - Part 1: Terminology and general principles

ČSN EN 953+A1:2009 Machinery safety – Safety covers – General requirements concerning construction and

	production of fixed and movable protective covers
ČSN EN 1037+A1:2008	Machinery safety – Preventing unwanted start
ČSN EN ISO 12100-2011	Machinery safety - Basic definitions, general principles of construction
ČSN EN ISO 13857:2008	Machinery safety – Safe distances to prevent contact of upper or lower extremities with dangerous places

5.2. Possibilities of placing

Placing of the boiler according to the power mains:

- The boiler must be placed in the way that the plug in the socket (230V/50 Hz) is always accessible.
- The boiler is connected to the electric power network with a tight connected cable terminated with a plug (according to the standards).
- Protection against electric shock must be ensured in compliance with the valid ČSN EN standards (see chapter 5.1.)

Location of the boiler with respect to the fire regulations:

1. Location at the fire resistant floor
    - Place the boiler at the fire safe isolating surface that overreaches the platform of the boiler in all proportions at least for 20 mm.
    - If the boiler is placed in the cellar it is recommended to place it at the bedding (at least 50 mm height). The boiler has to be horizontally well balanced, eventual unevenness could be removed with fine screwing of the feet under the fuel container.

2. Safety zone from flammable materials
    - During the installation and operation of the boiler, the safety distance between boiler outer dimensions including smoke-flue and the flammable materials (see detailed specification in ČSN EN 13 501-1+A1:2010) must be kept at at least 400 mm.

Placing of the boiler according to the required free space – see fig. 7:

- basic setting AA5/AB5 according to ČSN 33 2000-1 ed.2:2009
- in front of the boiler manipulation area of minimum 1000mm is required
- the minimum distance between the back-side of the boiler and the wall is 400 mm
- for case of removing of the worm feeder 500 mm distance between the wall and the side of the boiler with the fuel container is needed
- At the side of the boiler's body must be handling area at least 500 mm for the possible cleaning of the heat-exchanger
- above the fuel container at least 350 mm is required for the possible full opening of the feed device cover sheet

Placing of the builer with respect to the chimney

- BENEKOV R16 and R26 boilers are to be connected to the chimney with a metal pipe of 145 or 150 mm diameter.
- **BENEKOV R51 boiler is to be connected to the chimney with a metal pipe of 200 mm diameter.**

Fuel storage:

- It is recommended to store the pellets in original packing from the producer (PET or so called “big bags”) at a dry place.
- it is forbidden to store the fuel behind the boiler or next to the boiler in the distance lower than 400mm from the boiler
- the producer recommends to store the fuel in the distance at least 1000 mm from the boiler or to store it in the separate room

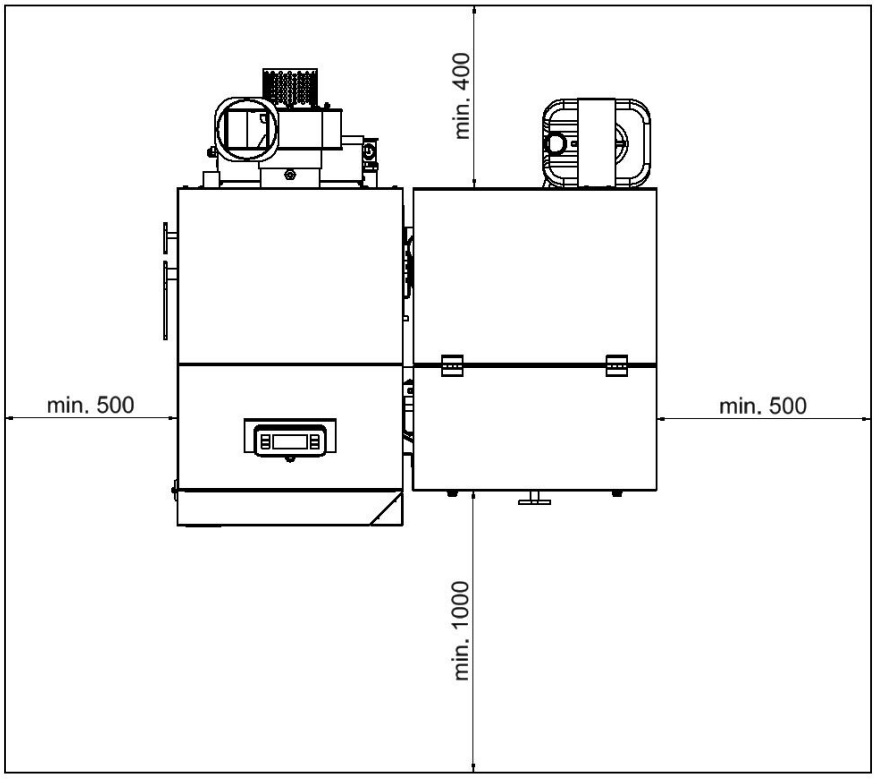


Fig. 7: Position of the boiler in the fire-room

Permanent air supply and discharge for burning and ventilation is required in the room where the boiler is installed. Air consumption of the boilers:

- BENEKOV R16 at the nominal power: approx. 45m^3/hour
- BENEKOV R26 at the nominal power: approx. 75 m^3/hour.
- BENEKOV R51 at the nominal power: approx. 150 m^3/hour.

Connection of the pipeline of the heating system or pipeline of the heating element must be done by the person certified for this activity

WARNING: When the boiler is connected with the heating system, the drain cock must be placed at the lowest place as near to the boiler as possible.

6. Installation - instructions for the contract service company

The heating boiler must be installed only by the authorized service company that is certified for assembly of these devices.

6.1. Electrical wiring by connectors

While running the boiler it is not allowed to interfere the electrical wiring of the control box. All the inlets for electrical wiring for all electrical parts of the boiler (including additional devices such as automatic ignition or deashing device) is placed on the back side of the boiler. Inlets are placed in the conectors which allow easy connection to or disconnection from the instruction control unit.

Depending on the type and equipment of the boiler, the following connectors are placed on the boiler and marked with the icons:

 - connector of the fuel feeder drive

 - ventilator drive connector

- automatic ignition drive connector

 - flue gas extractor

 - deasher drive connector

 - water circulating pump connector

 - room thermostat connector or equithermal regulation connector

- ignition sensor connector

- lambda probe connector

- additive discharger connector

- limit switch of the fuel container cover

Free plug contacts (e.g. for connecting the indoor thermostat, circulation pump etc.) are delivered in a pack inside the boiler. Before startup, these have to be installed on the switchboard, even if they are not used.

When connecting the connectors, it is necessary to pay attention so that the right connectors are connected – i.e. it is only allowed to connect the plug contact and the plug with the identical symbols.

Prior to connecting the room thermostat or equithermal regulation, it is necessary to remove the jumperfrom the connector plug. Only a thermostat with a free non-potential contact (e.g. SIEMENS, HONEYWELL CM…) can be connected to the room thermostat or equithermal regulation contact. No foreign voltage may be connected to the terminals.

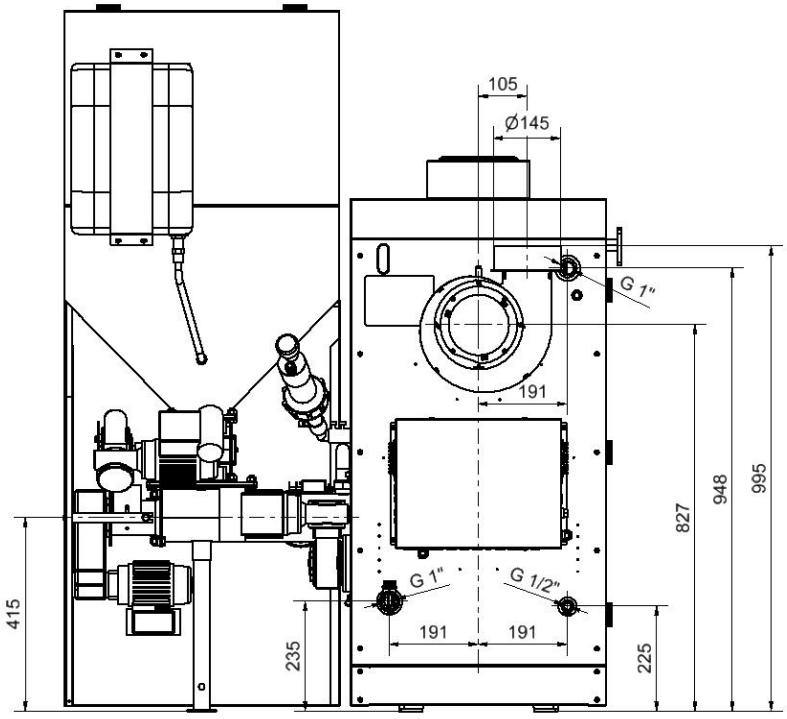


Fig. 8: Connecting dimensions of BENEKOV R16 boiler

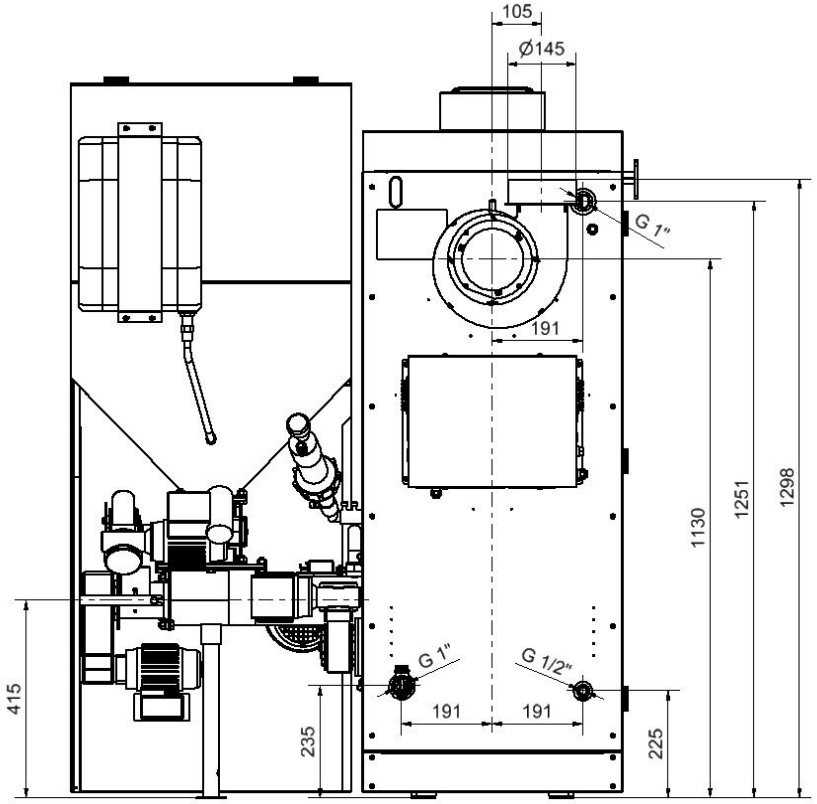


Fig. 9: Connecting dimension of BENEKOV R26 boiler

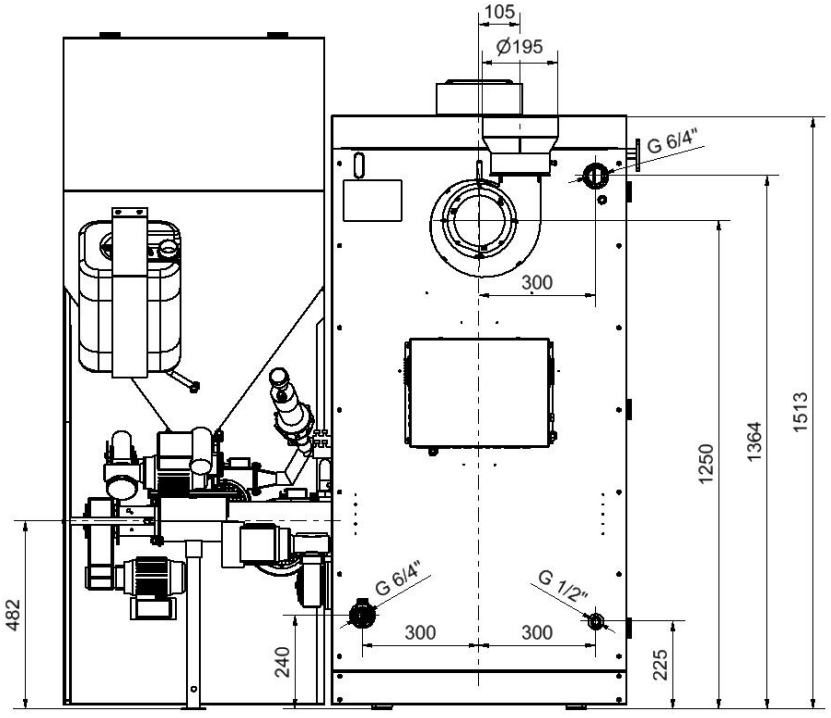


Fig. 10: Connecting dimensions of BENEKOV R51 boiler

6.2. Check before use

Before the boiler is set into operation it is important to check:

a) filling of the heating system with water

   The water used for the filling of the heating system must be clear and colourless, without suspended substances, oils and chemically aggressive substances. The water hardness must satisfy the standard ČSN 07 7401:1992 and if the hardness of the water doesn't conform to this standard the water must be treated. Even the repeated warming of the water with higher water hardness doesn't improve the quality of water and doesn't prevent the appearance of salts at the surface of the heat-exchanger. The appearance of the calc in the total thickness of 1mm reduces the exchange of heat approximately by 10%.
   The heating system with open expansion tank enables direct contact of the heating water with the atmosphere. During the heating season the water in this open expansion tank absorbs the oxygen which subsequently supports the corrosive effect and at the same time the vaporisation of the heating water increases. To make up for a loss of water it is recommended to use the treated water acc. to the standard ČSN 07 7401:1992. Also it is important to rinse the system to wash away all the impurities.
   During the heating period it is important to keep the constant volume of water in the heating system. During the refilling of the heating system with water the entry of air in the system must be prevented. The water from the boiler and from the heating system mustn't be used for any other purpose and it is recommended not to leak the water from the system with no serious reason (repairs etc.). The empty system is more sensitive to corrosion and creation of the scale.
   The refilling of the water in the heating system is recommended only when the boiler is cool. This prevents the damage of the steel heat-exchanger.

b) tightness of the heating system

c) connection to the chimney – must be approved by the chimney service company

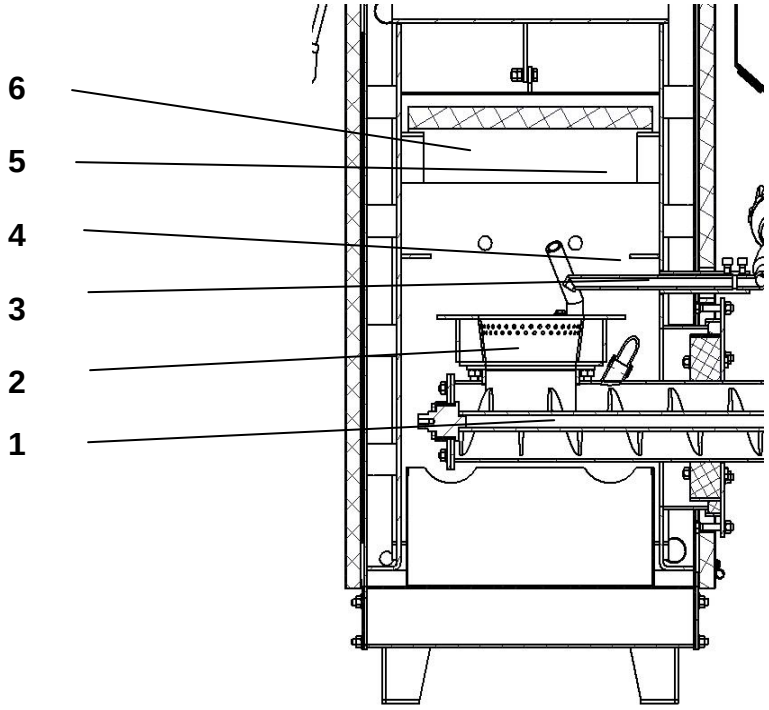


Fig. 11: Sectional view at the combusting chamber of the pellets boiler

1. worm fuel feeder
2. grate
3. ignition tube
4. secondary air tube
5. ceramic reflector catalyser
6. beam of the ceraimc catalyser

d) install the reflector (5) into the combusting chamber over the burner acc. to the Fig. 11, i.e. on the beam (6) in the boiler and pull to the back of the combusting chamber
e) connect the boiler to the electrical power network

The sockets are connected in the way that the earthing contact is at the top and the phase wire is connected at the left side (from the front view). The same principle is used also for the double sockets.

The installation record and the stoking test record must be mentioned in the certificate of warranty.

6.3 Starting up of the boiler

1. If the boiler is equipped with the fire extinguishing device with paraffin plug, fill its tank with water.

2. If the boiler is equipped with fire extinguishing device with thermostatic valve and pressure tank, put into operation the the pressure botle of the emergency extinguishing system. Proceed as follows:
    a) remove the black plastic cap from the valve on the bottom of the pressure bottle
    b) by means of a compressor or an air pump, pressurize the pressure bottle to 0,5 bar
    c) screw the black plastic cap back onto the valve on the bottom of the pressure bottle
    d) connect the fire extinguishing system to the water supply system

3. Heat up in the boiler.
4. Bring the boiler to the working temperature. The recommended working temperature of the output water is 65–80°C.
5. Check again the tightness of the boiler.
6. Carry out the stoking test according to the appropriate norms (see Certificate of warranty)
7. Inform the user about the boiler attendance - see chapter 7.
8. Make a record in the Certificate of warranty.

7. Attendance by the user

7.1 Heating up in the boiler

1. Check the quantity of water in the heating system.
2. Check if the stop valves between the boiler and the heating system are opened.
3. Check if the water circulating pump is working.
4. Clean the burner and the ashtray.
5. Fill the container with the specified fuel - see chapter 3. After the refilling **close the container carefully** to prevent the intake of the false air in the burner through the feed worm.
6. Connect the boiler to the electrical power network (230V/50Hz) with a cable and a plug.
7. **If the boiler is equipped with the automatic ignition**, don't take further steps as the Instruction Control Unit analyses the state of the boiler and take further steps as heating up etc. (see the separate Instruction Control Unit users manual). During the heating up and the running of the boiler the fire door must be closed.
8. **If the boiler is not equipped with the automatic ignition,** it is necessary to heat the boiler up manually (see the separate Instruction Control Unit users' manual). Use the manual mode at the Instruction Control Unit to transport the fuel to the combusting area. Let the worm feeder switched on until the fuel appears in the burner (approx. 1 cm under the grate rim). Further on switch off the worm feeder, place some kindling (paper, dry wood chips, solid alcohol or some other fire lighter recommended for these purposes) on the top of the fuel, set the fire and wait until the fire begins to burn (1-2 min.) Then add a

small amount of specified fuel and switch on the ventilator. If the fire expires, repeat the process of the manual heating up. Close the door and let the fire begin to burn (3-5 min).

7.2.Operating of the boiler

After the fuel begins to burn, the boiler switches to the automatic operation (see the separate Instruction Control Unit user manual) during which the ventilator and the cycling of the worm feeder are in operation. The main information about the heating are presented at the display of the Instruction Control Unit.

The operation of the boiler is fully automatic until the temperature of heating water set at the control thermo regulator is reached. Then the boiler switches automatically to the economic mode and stays in this mode until the temperature of the heating water drops under the temperature set at the control thermo regulator.

In case of blackout of the supply voltage (230 V, 50 Hz), the Instruction Control Unit keeps in memory the last data and after the voltage recovery returns to the previous state.

If the temperature of the heating water rises over 95°C the emergency thermo regulator comes in operation and independently on the Instruction Control Unit cuts off the boiler. The Instruction Control Unit then displays an overheating of the boiler. It is possible to switch the boiler only after the temperature sinks about 20°C below the set temperature by unscrewing the black cap at the emergency thermo regulator and pressing the red switch. Then the black cap must be returned back.

To prevent an undesirable switching of the emergency thermo regulator it is recommended to operate the boiler at the maximum output water temperature lower than 80°C.

In case of frequent switching off the boiler must be shut down and the cause of repeated overheating must be established.

7.3. Boiler shutdown

Before the shutting down of the boiler,the burning fuel must be ejected from the burner to the ashtray. This operation is not necessary only in case of short time repairs and if the operator is present.

In case of a shut down longer than 12 hours (e.g. cut out), **the container must be emptied** and if there is a possibility that the water in the emergency extinguishing system can freeze, it is necessary to remove the pressure tank as well.

IMPORTANT WARNING:

- **This appliance cannot be operated by persons (including children) who are not physically, sensorially or mentally fit to do so and have sufficient knowledge and experience needed in order to operate the boiler safely.**
- **Children must not be left unattened in proximity of a running boiler.**
- **If case a danger appears of the explosion or fire hazard due to the entry of flammable vapours in the fire room, or due to activities that involve use of flammable substances (gluing of PVC, painting etc.) the boiler must be shut down.**
- **During the control of the transport of fuel to the combusting space before the initial ignition, it is necessary to make a visual check only. <u>The inserting of hand in the worm feeder is forbidden because of impending danger of injury!</u>**
- **It is forbidden to use flammable liquids for firing.**
- **If boiler uses the automatic ignition it is necessary to keep the fuel level in the fire grate before the ignition process max. at the same level as upper rim of fire grate and the fuel cannot cover the ignition tube. In any case there could be the danger of explosion inside the combustion chamber.**
- **The observation of the flames is possible though the control window in the upper part of the fire door. If it is necessary to open the door during the operation of the boiler (for example for removing of ash from the ashtray) please keep in mind that there exists an enhanced risk of spark outlets to the fire room. In such case the door must be closed immediately and properly. Opening of the door during the boiler operation must be done carefully, that means to open it slightly, wait until the combustion products exhaust from the combustion chamber and only then open it fully.**
- **During the operation of the boiler the container must be closed carefully.**
- **The fuel is filled in the container at the most extent 30 mm under the lower rim of the filling gap to ensure proper closing of the container.**
- **It is strictly forbidden to overheat the boiler.**
- **It is forbidden to lay flammable subjects at the boiler or in the distance closer than the safety distance mentioned (see chapter 5.2.).**
- **During cleaning of the ashtray, there should not be flammable materials closer than at least 1500 mm from the boiler. The ash has to be stored in non flammable bins with a cover.**
- **During the operation of the boiler at temperatures lower than 60°C, the iron boiler body grows damp and there appears low temperature corrosion that influences in a negative way the working life of the boiler. That's why the boiler, must be operated at the temperatures higher than 60°C.**
- **After the end of the heating season the boiler and the chimney must be cleaned carefully. The fire room must be kept clean and dry.**

- **It is strictly forbidden to infringe in the construction and electrical system of the boiler.**

7.4. Residual risks and their prevention

The risks connected to regular operation of the boiler as well as to logically foreseeable incorrect operation was minimalized using available technical solutions. Despite the technical and construction-related measures carried out, the operation of the boiler bears residual risks determined by means of a risk analysis. These risks are the result of the technological process during different phases of the device service time.

In particular, these risks are a result of carelessness during boiler attendance or a failure to comply with the safety instructions during operation.

To further decrease these risks and make the operation even safer, the following list contains an overview of residual risks which no technical solution can remove.

a) Electrical risks

- connection, maintenance and repair of electrical parts of the boiler can be carried out only by qualified workers and in compliance with current technical regulations and standards
- power supply installation must be in line with the current regulations
- the power cord and boiler electrical installations must be checked regularly and kept in a proper state
- if any damage occurs to the electrical equipment, it is necessary to shut down the boiler, disconnect in from the power supply and provide qualified service
- it is forbidden to tamper with the connections of the safety circuits or carry out any unauthorized changes that could have impact on safety and reliability of the device

b) Heat risks

- the boiler must not be subjected to a higher working overpressure than stated
- it is forbidden to overheat the boiler
- the boiler must be protected from corrosion caused by low temperature of returning water by means of a suitable connection with automatic temperature control of returning water
- only listed fuel can be combusted in the boiler
- it is forbidden to store combustible materials near the boiler
- it is necessary to minimize the risk of ignition of the fuel container by suitable setting of attenuation parameters
- when operating the boiler, it is necessary to pay maximum attention to heat sources as they may cause burns

c) Risks connected to manipulation with fuel

- during manipulation with fuel, solid particles are emitted. Therefore, the operator should, depending on the degree of dustiness, use suitable protective equipment.
- because of the risks connected to manipulation with fuel, it is necessary to comply with applicable fire regulations and a fire extinguisher must be available

d) Ergonomic risks

- the boiler must be in a horizontal position
- it is forbidden to insert hands in the worm conveyor
- during operation of the boiler, all doors, covers and guards must be closed properly

8. Boiler maintenance

1. It is important to refill the fuel in time. If only a small amount of fuel is in the container, it must be refilled immediately to prevent the intake of the false air, eventually the smoke in the container. **ATTENTION: The lid of the fuel bin must be closed properly.**

2. If the boiler is well adjusted, the ash appears in the form of a fine powder which falls in the ashtray. The combustion area has a self cleaning effect and during the common operation the ashtray needs to be cleaned once a week. Use protective gloves for this activity!

3. If the boiler runs continuously, it is recommended to clean the heat transfer surface of the body of the boiler once a week. During the continuous operation the heat transfer surfaces are polluted which influences the heat-exchange and the boiler output.
   Also it is important to clean occasionally (once a month) the inner part of the grate as any possible sediments influence negatively the air circulation in the burner nozzles.
   It is recommended at least 1 hour before the cleaning of the inner part of the grate to shut down the boiler with the main switch. After the heating season the boiler must be completely cleaned.

4. Minerals contained in the wooden pellets can create hard crust in the fireplace and can cause the complete blockage of the worm-gear-system. To avoid such risk it is recommended to check at least once a month the burner area and remove manually any hard sediments on the grate.

5. Further, it is recommended to clean from time to time with a dry brush the **outside** of the engine with the gear and the ventilator. **During the cleaning the boiler must be disconnected from the electrical power.**

6. Over the burner a heat-resistant ceramic reflector is installed. There is no special care demanded; only the ash appears at the surface of the reflector. The ash can be removed, but the function of the device is not influenced.

7. The engine is protected against the damage with thermo contact which ensures the protection against burn off especially in the case when the feed device is blocked. **(regular temperature of the engine can reach 85°C).** In case of overheating (if the critical temperature was exceeded) the thermo contact shuts down the engine and the ventilator. Then you must switch off the boiler, clear the fuel from the container through the discharging gap and eliminate the fault. **WARNING: before any handling with the boiler check if the boiler is disconnected from the electrical power (the plug is pulled out of the socket).**

8. As there can appear a slight overpressure in the burner area due to the function of a ventilator, keep in mind that the boiler must be tightly closed (fire door, upper cover, cleaning gap of the feeder, container cover etc.).

9. **If the boiler is equipped with the fire extinguisher with paraffin plug**, make a visual check of the emergency extinguishing system from time to time and refill water if necessary.

10. **If the boiler is equipped with the fire extinguishing system with the thermostatic valve and pressure bottle** and If an emergency condition (power cut for longer time) appears and the fuel burns up to the fuel container, due to the higher temperature at the bottom of the fuel container the thermostatic valve is opened and the space is filled with water form the water supply system or from the installed water pressure tank (see chapter 7.1.).
    If the water pressure tank is a part of the emergency extinguishing system the air pressure in the tank must be checked at lest once a year. Remove the cap of the valve at the tank and with use of a common manometer check the pressure. If the pressure is not sufficient, regulate the pressure with an air pump or compressor to 0,5 bars.

11. The worm feeder drive gear and the turniket drive gear are filled with synthetic oil from the production, that's why the further maintaining is not required.

10. Troubleshooting

If problems with operation of the boiler appear try to follow one of the following solutions:

SYMPTOM	REASON	SOLUTION
There is no data at the display.	The boiler is not connected to the network.	Connect the boiler to the electrical power network (230V/50Hz) with appropriate cable with plug.
	Malfunction of the boiler controller.	Change the controller for a new one.*
The worm feeder doesn't work.	The cable of the engine is disconnected / damaged.	Connect the engine / change the cable to the engine.*
	The engine is damaged.	Change the engine.*
	The engine was overheated and the thermal protection was activated.	Let the engine cool down, after cooling the engine starts again.
The thermal protection of the engine was activated repeatedly.	The worm feeder is blocked (stone, etc.)	Dismantle the worm feeder and remove the problem. Make a re-assembly of the device.*
	In the fuel there is a great amount of dust.	Remove the inappropriate fuel from the boiler; fill the container with the specified fuel.
The boiler drive is working, but the worm feeder doesn't work	The elastic pin between the worm feeder and the drive rod was cut.	Remove the rest of the broken pin and install a new one (8x45, ISO 8752).
The worm gear is moving nevertheless the fuel is not transported in the combustion area.	There is no fuel in the container.	Fill the container with recommended fuel.
	The worm gear was worn out.	Change the worm gear.*
The boiler ventilator doesn't work.	The cable of the ventilator has been disconnected / damaged.	Connect (change) the cable to the ventilator.*
	The ventilator is broken.	Change the ventilator.*
The ventilator is noisy.	The ventilator is full of dust.	Clean the ventilator.*
	The ventilator bearing is worn out.	Change the whole ventilator.*
During the boiler modulation at the lowest output, the ventilator does not turn.	The set values of ventilator speed (revolutions) are too low.	Increase the values of the ventilator turns so that continuous operation of the ventilator is ensured.
The water from	The fuel has burnt off	Remove the wet fuel from the

the emergency extinguishing system runs in the fuel container.	in the fuel container and the thermostatic valve was opened.	boiler, refill the container with the new fuel and put the boiler into the operation.
The water from the emergency extinguishing system drops in the fuel container.	The thermostatic valve was broken.	Change the thermostatic valve.
Water drops appear on the walls of fuel container.	Wet fuel is used in the boiler.	Fill the container with dry fuel.
	Low temperature in the fire room (12°C and less).	It is necessary to ensure higher temperature of the fire room (insulation of fire room walls, installation of a heating body in the fire room etc.)
The boiler can't reach the full nominal capacity.	The time from the firing was too short.	Let the boiler burn up.
	The fuel dosage is adjusted to a lower capacity.	Set up the fuel dosage according to the manual to the Instruction Control Unit.
	There was used a different fuel than recommended (high humidity, lower heating power etc.).	Fill the container with appropriate fuel.
The exhaust gas temperature is higher than the recommended in the user's manual.	The boiler is soated with smoke particles.	Clean the heat transfer surfaces
	The boiler is overheated.	Adjust the fuel dosage according to the Instruction Control Unit manual.
	High boilers draught.	Install a draught limiter at the chimney (this activity can be maintained by the service company only).
	The ceramic reflector is not installed in the boiler.	Install the ceramic reflector according to the user's manual.
	The firing flap in the boiler is open.	Using the handle of firing flap and cleaner, close the firing flap and secure it with the locking screw with plastic head.

The smoke appears in the fire room or in the fuel container.	Low chimney draught.	Ensure the inspection of the chimney draught at the service chimney company. If the draught value is lower than the required value (see users manual) the adjustment of the chimney is required.
	Fire door and/or the upper boiler cover and/or the fuel container cover are not closed properly.	Close the fire door and/or the upper cover of the boiler and/or the fuel container cover.
	The sealing gasket at the fire door or at the upper boiler cover was worn out/damaged	Change the sealing gasket.*
	The rubber sealing of the fuel container cover is damaged.	Change the rubber sealing.*
	The container cover is not tight.	Vertically adjust the latch at the fuel container cover.
	The fuel container is empty.	Fill the fuel container with the fuel.
The boiler is soated with smoke particles in a short period of time.	Low amount of agitated air.	Raise the ventilator capacity (see Instruction Control Unit manual).
	The boiler is repeatedly overheated	Set the boiler capacity to the nominal capacity (see Instruction Control Unit manual).
	The grate is full of dust and ash.	Clean the grate.
	The ventilator is broken.	Change the boiler ventilator.*
The ash at the grate is sintering.	Other than recommended fuel was used for burning.	Fill the container with appropriate fuel (see chapter 3).
A great quantity of unburned fuel appears in the ashtray.	The fuel dosage is maladjusted.	Lower the dosage of fuel in the burner (see the Instruction Control Unit manual).
	The fuel used for burning is wet.	Fill the container with appropriate (dry) fuel.
	The power of the ventilator is wrongly set and the stream of air blows the fuel out of the burner.	Lower the ventilator speed (see Instruction Control Unit manual).

* - this activity can be maintained only by an authorized service company certified by company BENEKOVterm s.r.o.

11. Instructions for long-term keeping of ecological parameters of the boiler

For fully ecological running of the boiler it is important to keep the provisions of this manual especially:

- Burn only a fuel the parameters of which are guaranteed by the producer of the fuel in the extent mentioned in the table 4, chapter 3.
- Fully keep the provisions of chapters 7 and 8.

12. Instructions for disposal after the service life

Keeping in mind that the boiler is made of common steel materials it is recommended to dispose the parts of the boiler in the following way:

- Boiler, covers	- through the company KOVOŠROT
- Other steel parts	- through the company KOVOŠROT
- Insulating material SIBRAL	- in the common waste
- Insulating material ORSIL T	- in the common waste
- Insulating material TECHROCK	- in the common waste

13. Warranty and the liability for defects

The producer provides a guarantee at the boiler in the period for 24 months from the data of sale to the final user on condition that the boiler will be used and operated in accordance with the conditions mentioned in the manual.

The user is obliged to entrust the installation of the boiler, putting into service, removing of defects that are exceeding the range mentioned in chapters 7 and 8 only to an authorized service company that is certified by company BENEKOVterm s.r.o. Otherwise the guarantee for proper function of the boiler is not valid.

The important condition for recognition of the guarantee is connection of the boiler to the heating system in such way, so that the temperature of the return water must be controlled automatically and higher than 60°C. This condition can be reached by using a mixing valve with servo drive, thermo valve (like ESBE TV40), device Laddomat 21, etc. Solution based on knowledge of the complete heating system should be proposed by a qualified person.

If the boiler is operated according to the instructions mentioned in this “Instruction and servicing manual” there is no specific servicing activity needed.

When the “Certificate of quality and completeness of the boiler BENEKOV” is completed by the service company it serves also as the certificate of warranty.

The boiler should be maintained regularly - see chapter 8.

The producer is in no case responsible for the loss of profit, good reputation or contracts and also for no accidental, special or subsequent damages that appear in connection with use or impossibility to use this product.

Each notice of defect must be announced in the written form and by phone call immediately after its detection. It is necessary to give the serial number of boiler.

In case of breach of the instructions the guarantee provided by the producer won't be admitted.

The guarantee does not cover the cases that originated in the wrong operation of the device, breaking technical conditions for operation of this device, common wear, voluntary waste and waste that was caused as a result of irreversible and uncontrolled event (fire, water, burglary, violent waste, etc.).

The certificate of warranty is not valid if the certificate is not filled in by the seller.

The producer reserves the right for changes that are made during the innovation of the product and that needn't be mentioned in this manual.

NOTICE
The completed certificate of warranty designed for the producer of boiler BENEKOV R15 please send by return at the below mentioned address:

BENEKOVterm s.r.o.
Masarykova 402
CZ - 793 12 Horní Benešov

Supplement to the certificate of warranty designed for the customer - user

Record about the realized guarantee and post guarantee repairs and about the realized controls of the product			
Date of the record	**Realized activity**	**Service company (signature, stamp)**	**Signature of the customer**

Prohlášení o shodě

v souladu s ust. § 13 odst. 2 zákona č. 22/1997 Sb., o technických požadavcích na výrobky, v platném znění a podle ust. § 13 nařízení vlády č. 163/2002 Sb., kterým se stanoví technické požadavky na vybrané stavební výrobky, v platném změní

Firma: **BENEKOVterm s.r.o.**
Masarykova 402, 793 12 Horní Benešov, Česká republika
IČO: 25839811, DIČ: 358-25839811

Jako výrobce výrobků: **Kotle teplovodní automatické na dřevěné pelety**
BENEKOV R16, BENEKOV R26, BENEKOV R51

Popis a určení funkce výrobku: Automatický teplovodní kotel s ocelovým svařovaným výměníkem, hořákem se spodním přívodem paliva, šnekovým podavačem a vestavěným zásobníkem paliva. Palivem pro tyto kotle jsou dřevěné pelety. Kotel BENEKOV R16 je určen pro vytápění objektů s tepelnými ztrátami do 20 kW. Kotel BENEKOV R26 je určen pro vytápění objektů s tepelnými ztrátami do 26 kW. Kotel BENEKOV R51 je určen pro vytápění objektů s tepelnými ztrátami do 49 kW.

Prohlašuji a potvrzuji, že:

- posuzování shody bylo provedeno postupem stanoveným v ust. § 7 nařízení vlády č. 163/2002 Sb., v platném znění na základě dokumentu ZÁVĚREČNÝ PROTOKOL o počáteční zkoušce typu výrobku č. 30-12200/1 ze dne 30. 4. 2014 s platností do 30. 4. 2016.
- norma určená k posouzení shody: ČSN EN 303-5 Kotle pro ústřední vytápění a další technické předpisy: ČSN 06 1008, ČSN EN ISO 11202, ČSN EN ISO 3746, ČSN EN 15036, ČSN EN 60335-1 ed.2, ČSN EN 60335-2, ČSN EN 62233, ČSN ISO 80000.
- Strojírenský zkušební ústav, s.p., Hudcova 424/56b, 621 00 Brno, autorizovaná osoba 202, která vydala ZÁVĚREČNÝ PROTOKOL o počáteční zkoušce typu výrobku č. 30-12200/1 ze dne 30. 4. 2014.
- vlastnosti výrobku splňují základní požadavky podle nařízení vlády č. 163/2002 Sb., konkretizované určenou normou ČSN EN 303-5 a požadavky jiných technických předpisů, že výrobek je za podmínek obvyklého, výrobcem určeného použití bezpečný.
- výrobce přijal opatření, kterými zabezpečuje shodu všech výrobků uváděných na trh s technickou dokumentací a se základními požadavky.

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IČ: 258 39 811 DIČ: CZ25839811

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Leopold Benda,
jednatel společnosti BENEKOVterm s.r.o.

V Horním Benešově dne 2. 5. 2014

Původní ES prohlášení o shodě

Výrobce: **BENEKOVterm s.r.o.**
Masarykova 402, 793 12 Horní Benešov, Česká republika
IČO: 25839811, DIČ: 358-25839811

Osoba pověřená kompletací technické dokumentace a oprávněná vypracovat ES prohlášení:
Leopold Benda
Masarykova 402, 793 12 Horní Benešov, Česká Republika

Výrobek: **Kotel teplovodní automatický na dřevěné pelety**

Typové označení: **BENEKOV R16, BENEKOV R26, BENEKOV R51**

Popis a určení výrobku: Automatický teplovodní kotel s ocelovým svařovaným výměníkem, hořákem se spodním přívodem paliva, šnekovým podavačem a vestavěným zásobníkem paliva. Palivem pro tento kotel jsou dřevěné pelety. Kotel BENEKOV R16 je určen pro vytápění objektů s tepelnými ztrátami do 20 kW. Kotel BENEKOV R26 je určen pro vytápění objektů s tepelnými ztrátami do 26 kW. Kotel BENEKOV R51 je určen pro vytápění objektů s tepelnými ztrátami do 49 kW.

Výrobce prohlašuje, že výrobek splňuje všechna příslušná ustanovení:

- Směrnice Evropského parlamentu a Rady 2006/42/ES (nařízení vlády č. 176/2008 Sb. o technických požadavcích na strojní zařízení)
- Směrnice Evropského parlamentu a Rady 2006/95/ES (nařízení vlády č. 17/2003 Sb. o technických požadavcích na elektrické zařízení nízkého napětí)
- Směrnice Evropského parlamentu a Rady 2004/108/ES (nařízení vlády č. 616/2006 Sb. o technických požadavcích na výrobky z hlediska jejich elektromagnetické kompatibility)

Výrobce také prohlašuje, že přijal opatření, kterými zabezpečuje shodu všech výrobků uváděných na trh s technickou dokumentací, se základními požadavky na výrobek a se schváleným typem.

Seznam harmonizovaných a ostatních norem použitých při posuzování shody:

ČSN EN 303-5:2013, ČSN EN 614-1+A1:2009, ČSN EN 953+A1:2009, ČSN EN 1037+A1:2008, ČSN EN ISO 12100:2011, ČSN EN ISO 13857:2008, ČSN EN ISO 3746:2011, ČSN EN ISO 11202:2010, ČSN 33 0165:1992, ČSN 33 1500:1990, ČSN 33 2000-1 ed.2:2009, ČSN 33 2000-4-41 ed.2:2007, ČSN 33 2000-5-51 ed.2:2006, ČSN 33 2000-7-701 ed.2:2007, ČSN 33 2030:2004, ČSN 33 2130 ed.2:2009, ČSN 33 2180:1979, ČSN 33 2350:1982, ČSN 34 0350 ed.2:2009, ČSN EN 55 014-1 ed.3:2007, ČSN EN 55 014-2:1998, ČSN EN 60079-14 ed.3:2009, ČSN EN 60335-1 ed.2:2003, ČSN EN 60335-2-102:2007, ČSN EN 60445 ed.3:2007, ČSN EN 60445 ed.4:2011, ČSN EN 61000-3-2 ed.3:2006, ČSN EN 61000-3-3 ed.2:2009, ČSN 06 1008:1997, ČSN EN 13 501-1+A1:2010, ČSN 73 4201:2010, ČSN 06 0310:2006, ČSN 06 0830:2006, ČSN 07 7401:1992

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