

Veto Stoker Boilers

30, 60, 75, 80, 100, 120, 150, 220 kW



User Manual

Installation, Operation, and Service

Retailer:

Keep this manual.

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1. Introduction

You have made a good choice in purchasing a Veto stoker boiler. The boiler together with a Veto burner offers a pure, economic, efficient, and near-emission-free way of burning renewable energy sources approved by the manufacturer. By avoiding using fossil fuels, you can considerably diminish the burden on the environment and prevent global warming.

This manual is for using the Veto stoker boiler. To gain the best possible benefit of the device, read this instruction manual carefully before installing, connecting or using the device. If all the instructions are followed, the device provides a long-lasting, economic, and faultless performance. Only use this manual with the device it was delivered with.

The instructions, descriptions and technical information are based on the latest knowledge on the structure of the boiler at the moment this instruction manual is created. We constantly develop our products further, and we therefore reserve the right to make any alterations without prior notice.

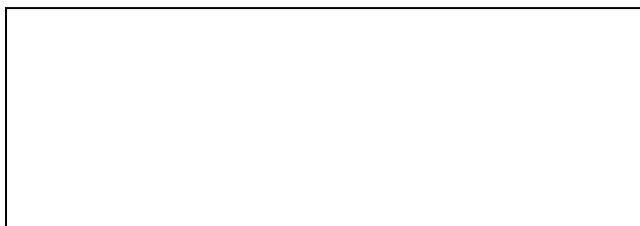


Improper use of the product can result in serious injury. To avoid injury, read and carefully follow all instructions provided in this manual before installing, operating, or servicing the device.



The instructions provided in this manual are recommendations. Laws and regulations of local authorities override our recommendations.

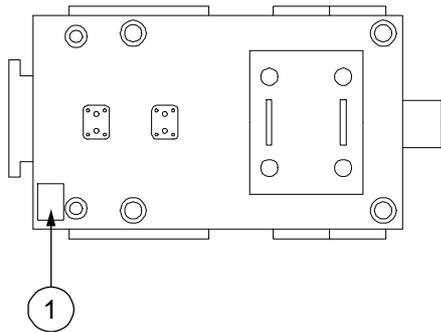
1.1. Contact information



1.2. Type plate information

Write down the information from the type plate for easy reference. You need the information when, for example, ordering spare parts or claiming warranty.

Figure 1 Type plate location



1 Location of the type plate in all 30-220 kW boilers

Table 1 Type plate information

Model	
Manufacturing year	
Serial number	

1.3. Warranty

The manufacturer Veljekset Ala-Talkkari Oy grants a warranty for the products that it manufactures and markets. The user is liable for damage resulting from use of the equipment for any purpose other than that for which it was designed.

The warranty period is one year from the date of delivery (EU countries: The device has a warranty that complies with the legislation in the country of use).

The warranty for parts changed under the warranty continues until the end of the original warranty period.

The prerequisite for warranty is observation of the installation, use, service and safety instructions for the device.

Continuation of the warranty for the device requires the use of original spare parts or those approved by the manufacturer. Service and any repairs performed during the warranty period must be assigned to a service company approved by the manufacturer.

Compensation for service during warranty period can also be claimed if:

- The service visit is unnecessary (the reason is not covered by the warranty).
- The manufacturer's instructions concerning installation, use and care have not been observed.
- Corrective measures were not taken immediately upon observation of the fault.

The warranty covers:

- Manufacturing and raw material defects in products manufactured by Veljekset Ala-Talkkari Oy.

The warranty does not cover:

- Defects or damage caused by:
 - Natural wear (spring agitator springs, feeding screw, grates, blades, feet, etc.)
 - Misuse of the product or use in violation of the instructions
 - Neglect of service in accordance with the instruction manual
 - Change work or repairs made without the manufacturer's consent
 - Other manufacturers' control devices or programs
 - Safety equipment that deviates from that delivered or is installed contrary to the instructions
 - External factors
- Breakage of parts preventing overloading
- Indirect costs or down time, or the resulting financial losses
- Work or travel costs unless separately agreed in advance with the manufacturer

1.3.1. Deficiencies in delivery and return of warranty parts

- Deficiencies in delivery must be reported within seven (7) days of the delivery.
- Broken warranty parts must be returned to the plant for a warranty inspection (include a warranty report).
- A part to replace the broken part can be delivered prior to warranty processing.
- An invoice for returned warranty parts that do not meet the terms of the warranty can be sent after warranty processing.
- The client can be charged for parts that are not returned upon request.

1.3.2. Processing of warranty matters

- The retailer is the primary contact channel in warranty matters and problem situations.
- The retailer handles processing of the matters with the manufacturer.
- The retailer must be provided with the following information: brand, model and purchasing date for the device and the serial number of the device from the type plate.

Warranty compensation is subject to determination of the cause of the damage and agreement with the manufacturer concerning the repair prior to initiating any repair work.

1.4. Product markings

NOTICE

Pay attention to the warning and information stickers: they help you to avoid risks.

Figure 2 Product marking locations

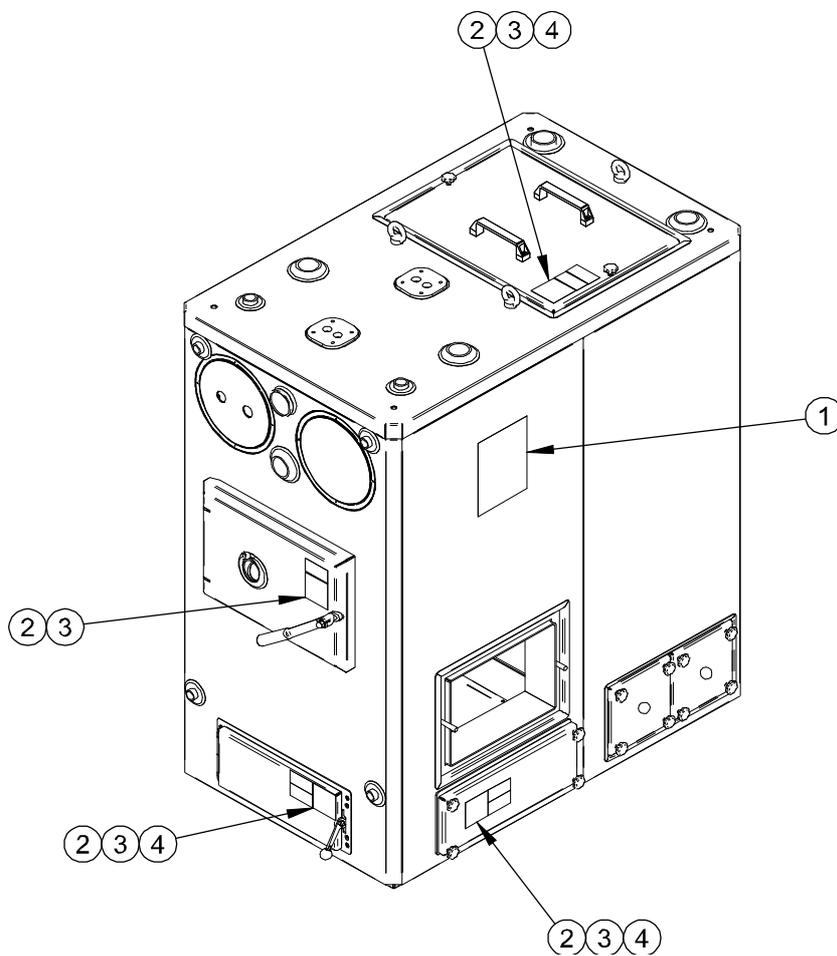


Table 2 Product markings on the device

Item	Product marking																		
1	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;">  <p>⚠ DANGER</p> <p>Risk of carbon monoxide poisoning and fire</p> <p>Leaving covers or hatches open leads to immediate risk of fire when device is in operation.</p> <p>Close covers and hatches airtight. Ventilate properly before entering fuel bin.</p> <p>Always work in pairs. When entering fuel bin have a person outside fuel bin to secure your safety.</p> </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> <p>⚠ DANGER</p> <p>Hazardous voltage will cause severe injury or death.</p> <p>Turn off power. Wait 15 min before service. Although control unit is dead, supply voltage from frequency converter remains.</p> </td> </tr> <tr> <td style="text-align: center; background-color: #FFD700;">⚠ WARNING</td> <td style="text-align: center; background-color: #FFD700;">⚠ WARNING</td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">  <p>Moving parts can crush and cut. Blower impeller rotates. Keep fingers away from rotating impeller. Switch off control unit before servicing.</p> </td> <td style="vertical-align: top; padding: 5px;">  <p>Moving parts can crush and cut. Feeding screw under lid starts rotating without warning. Switch off power before opening lid.</p> </td> </tr> <tr> <td style="text-align: center; background-color: #FFD700;">⚠ WARNING</td> <td style="text-align: center; background-color: #FFD700;">⚠ WARNING</td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">  <p>Bin lid may suddenly close due to strong wind or weakened gas springs. During maintenance ensure lid stays open in all conditions.</p> </td> <td style="vertical-align: top; padding: 5px;">  <p>Risk of burn and fire. Device is hot and remains hot after switch-off. Do not cover burner head. Keep it clean. Be cautious in boiler room.</p> </td> </tr> <tr> <td style="text-align: center; background-color: #FFD700;">⚠ WARNING</td> <td style="text-align: center; background-color: #FFD700;">⚠ WARNING</td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">  <p>Moving parts can crush and cut. Burner runs intermittently and starts without warning. Even when device is switched off springs may have potential energy. Do not enter fuel bin while power is on.</p> </td> <td style="vertical-align: top; padding: 5px;">  <p>Hot water in boiler. When pressure rises hot water may discharge through relief valve. Be careful near relief valve's downpipe. Do not let cold water inside hot boiler.</p> </td> </tr> <tr> <td style="text-align: center; background-color: #FFD700;">⚠ WARNING</td> <td style="text-align: center; background-color: #FFD700;">⚠ CAUTION</td> </tr> <tr> <td style="vertical-align: top; padding: 5px;">  <p>Inhalation hazard Air born particulates Dust mask required during sweeping boiler and working in silo. Protect device from dust.</p> </td> <td style="vertical-align: top; padding: 5px;">  <p>Do not step on motor. Motor surface is slippery. Motor may get damaged.</p> </td> </tr> </table>	 <p>⚠ DANGER</p> <p>Risk of carbon monoxide poisoning and fire</p> <p>Leaving covers or hatches open leads to immediate risk of fire when device is in operation.</p> <p>Close covers and hatches airtight. Ventilate properly before entering fuel bin.</p> <p>Always work in pairs. When entering fuel bin have a person outside fuel bin to secure your safety.</p>	<p>⚠ DANGER</p> <p>Hazardous voltage will cause severe injury or death.</p> <p>Turn off power. Wait 15 min before service. Although control unit is dead, supply voltage from frequency converter remains.</p>	⚠ WARNING	⚠ WARNING	 <p>Moving parts can crush and cut. Blower impeller rotates. Keep fingers away from rotating impeller. Switch off control unit before servicing.</p>	 <p>Moving parts can crush and cut. Feeding screw under lid starts rotating without warning. Switch off power before opening lid.</p>	⚠ WARNING	⚠ WARNING	 <p>Bin lid may suddenly close due to strong wind or weakened gas springs. During maintenance ensure lid stays open in all conditions.</p>	 <p>Risk of burn and fire. Device is hot and remains hot after switch-off. Do not cover burner head. Keep it clean. Be cautious in boiler room.</p>	⚠ WARNING	⚠ WARNING	 <p>Moving parts can crush and cut. Burner runs intermittently and starts without warning. Even when device is switched off springs may have potential energy. Do not enter fuel bin while power is on.</p>	 <p>Hot water in boiler. When pressure rises hot water may discharge through relief valve. Be careful near relief valve's downpipe. Do not let cold water inside hot boiler.</p>	⚠ WARNING	⚠ CAUTION	 <p>Inhalation hazard Air born particulates Dust mask required during sweeping boiler and working in silo. Protect device from dust.</p>	 <p>Do not step on motor. Motor surface is slippery. Motor may get damaged.</p>
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2	<table border="1"> <tr> <td data-bbox="304 277 536 880">  </td> <td data-bbox="536 277 991 880"> <p style="text-align: center;">⚠ DANGER</p> <p>Risk of carbon monoxide poisoning and fire</p> <p>Leaving covers or hatches open leads to immediate risk of fire when device is in operation.</p> <p>Close covers and hatches airtight. Ventilate properly before entering fuel bin.</p> <p>Always work in pairs. When entering fuel bin have a person outside fuel bin to secure your safety.</p> </td> </tr> </table>		<p style="text-align: center;">⚠ DANGER</p> <p>Risk of carbon monoxide poisoning and fire</p> <p>Leaving covers or hatches open leads to immediate risk of fire when device is in operation.</p> <p>Close covers and hatches airtight. Ventilate properly before entering fuel bin.</p> <p>Always work in pairs. When entering fuel bin have a person outside fuel bin to secure your safety.</p>		
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4	<table border="1"> <tr> <td colspan="2" data-bbox="304 1211 991 1270" style="text-align: center;">⚠ WARNING</td> </tr> <tr> <td data-bbox="304 1270 536 1478">  </td> <td data-bbox="536 1270 991 1478"> <p>Inhalation hazard</p> <p>Air born particulates</p> <p>Dust mask required during sweeping boiler and working in silo. Protect device from dust.</p> </td> </tr> </table>	⚠ WARNING			<p>Inhalation hazard</p> <p>Air born particulates</p> <p>Dust mask required during sweeping boiler and working in silo. Protect device from dust.</p>
⚠ WARNING					
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1.5. Product documentation

Table 3 Related product documentation

Manual name	Identification
Control unit	
A•T Log-1 and A•T Log-2 Control Unit User Manual	ATL20132803EU1.0
Lambda 5S control unit	039 028 06_LAMBDA 5S GB_v8
Burners	
VetoMat User Manual	VMB20132803EU1.0
Veto ChipMatic User Manual	VCM20132803EU1.0
Veto 6 User Manual	V6T20132803EU1.0
Veto 8 User Manual	V8T20132803EU1.0
Veto Spring Agitator User Manual	VST20132803EU1.0
Other	
TA control Unit Data Sheet	TAC20132803EU1.0
Ash Screw Data Sheet	ASD20132803EU1.0
Rotary Feeder Data Sheet	RFD20132803EU1.0
VetoMat Transport and Storage	VMT20121221US1.0
ChipMatic Transport and Storage	CMT20121221US1.0
Veto 6 Transport and Storage	V6T20130328US2.0
Veto 8 Transport and Storage	V8T20130328US2.0
Boiler Transport and Storage	SBT20121221US1.0
Veto Spring Agitator Transport and Storage	VST20121221US1.0
Veto Burner Head 160, 240, 360, 480, 640, 800 and 990 kW User Manual	VBR20130328EN1.0
Veto Burner Head 160, 240, 360, 480, 640, 800 and 990 kW Transport and Storage	VBT20121221US1.0
Veto Air	VAIR2V20012012GB
Other manufacturers' documentation	
Frequency converter user manual 1.5 kW	ATV312HU15N4
Frequency converter user manual 2.2 kW	ATV312HU22N4
Boiler Thermostat User Manual	1282/B-07/01
BVTS User Manual	IC.PI.500.E4.72- 520B4081
Dry-boil Protection Centre User Manual	D17016Ds

1.6. Version history

Table 4 Document version history

Version	Date	Changes
1.0	28.03.2013	First version

1.7. Document conventions

1.7.1. Symbols

Table 5 Symbols used in this document

Symbol	Explanation
	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	Indicates special information to the reader, but not related to personal injury.

1.7.1. Other document conventions

Table 6 Document conventions

Item	Convention	Example
Italics	Indicates a reference within this document.	Refer to <i>1.7.1. Document conventions</i> .

2. General safety and warnings

These general safety instructions help you to avoid dangerous situations when installing, operating or servicing the device. Important safety instructions are also presented in the beginning of each section.

DANGER

Do not make any alterations to the original device design. Any alterations to the product may result in serious hazard to people, property or environment.

Installation and service of the device must only be performed by an authorized professional installer following all the requirements of the authority having jurisdiction over the installation.

Incorrect installation, operation, and service of this device could result in severe personal injury, death, or substantial property damage from fire, carbon monoxide poisoning, soot or explosion.

Risk of fire! Fuel remains on the floor may catch fire from a spark, and fire may spread to the structure of the building. Keep the boiler room tidy.

Risk of fire! Do not use the boiler room as a general storage space due to fire hazard.

Risk of carbon monoxide poisoning! When using the device, always ensure that the service doors are completely shut to prevent hot chimney gas from entering the boiler room.

WARNING

The boiler must only be used together with a Veto burner device and a control unit.

Risk of burn! The service doors are always hotter than the rest of the boiler surface. Also some of the pipes are hot. Always be cautious in the boiler room.

Risk of carbon monoxide poisoning and fire! Keep ash in a metal container.

CAUTION

Ashes or fuel may contain constituents causing allergic reactions.

- Use appropriate protective equipment such as respiration protector when handling ashes or fuel.
- Use clothes and gloves made of infusible materials when servicing the boiler.

3. Product description

Veto stoker boiler is an effective, economical, easy to use and environmentally friendly central heating boiler.

Veto stoker boiler is designed to be used with a control unit and a stoker burner using solid fuel, such as chips, pellets and briquets as a heating source.

The boiler delivery includes:

- Gauge for boiler water temperature
- System pressure gauge
- Cleaning rake for removing soot and ash from flue gas circulations and fire surfaces
- Lifting lug for lifting the boiler
- User manual

NOTICE

The delivered gauges are not calibrated.

3.1. Product variants

Boiler outputs are achievable as defined in the 14961-4 standard. The chip class is A1, piece size P31.5 and moisture M25.

Δt must be 20°C. Minimum furnace underpressure of 15Pa.

Δt = temperature difference between output water and return water.

- The power capacity of the boilers ranges from 30 kW to 220 kW:
 - Veto 30 (30 kW)
 - Veto 60 (60 kW)
 - Veto 75 (75 kW)
 - Veto 80 (80 kW)
 - Veto 100 (100 kW)
 - Veto 120 (120 kW)
 - Veto 150 (150 kW)
 - Veto 220 (220 kW)
- The water coil is only available for 30, 60, 80 and 100 kW stoker boilers.

- If a particularly large amount of hot water is needed, it is possible to install two water coils side by side in the boiler. Available for 60, 80 and 100 kW boilers.
- The burner can be installed to enter the boiler on the front, or from the right or the left side.

NOTICE

The handedness of the service doors and the side for the feed-through connection for the burner is selected when the product is ordered and cannot be changed afterwards.

3.2. Optional accessories

Accessories that can be ordered separately:

- Four-way mixing valve for adjusting the water circulation
- Ash screw for removing ash automatically from the boiler at appropriate intervals
- Veto Air
- Flue gas cleaner (150 and 220 kW)
- Lambda control
- Electric resistance (30, 60, 80, and 100 kW boilers)
- Veto XL control unit
- Flue gas blower (underpressure control)

4. Technical data

Table 7 Requirements for flues, chimney, compensation air holes, and chimney gas

Height of the chimney (from floor level)	30 kW	5 m
	60, 75, 80 kW	6 m
	100 kW	7 m
	120, 150 kW	8 m
	220 kW	14 m ¹
Recommended chimney size Ø mm (in)	30, 60, 75, 80, 100 kW	Ø 200
	120, 150 kW	Ø 250
	220 kW	Ø 330
Area of the brick chimney (30-120 kW)		ca. 300 cm ² ; 160–180 mm x 160–180 mm
Area of the brick chimney (150, 220)		200-300 x 200-300 mm
Diameter of the insulated steel chimney		Ø 180–300 mm
Size of the compensation air hole of the boiler room		1.5 x chimney size
Temperature of chimney gas	Brick chimney	min. 150°C
	Steel chimney	min. 120°C
Chimney gas connector, width x height	30 kW	Ø168 mm
	60, 75, 80 kW	Ø168 mm
	100, 120 kW	Ø194 mm
	150 kW	Ø240 mm
	220 kW	Ø300 mm

¹ Flue gas cleaner and a 6-meter chimney are recommended.

Table 8 Technical data for boiler

	Power (using a solid fuel burner)							
	30 kW	60 kW	75 kW	80 kW	100 kW	120 kW	150 kW	220 kW
Weight kg	520	685	675	770	880	865	1050	1650
Boiler width x length x height mm	625x 1160x 1406	725x 1190x 1425	725x 1190x 1425	725x 1190x 1620	825x 1340x 1630	825x 1340x 1630	825x 1605x 1830	1075x 1875x 1850
Water volume l	270	340	290	410	475	385	460	850
Productive capacity of the water coil	35 l/min		-	35 l/min		-		
Chamber length x width x height mm	480x 400x 690	455x 500x 690	455x 500x 940	455x 500x 850	600x 600x 900	600x 600x 1100	800x 600x 1150	800x 850x 1150

Table 9 Flue gas connection's location

Flue gas connection's location		Left	Back	Right
Chimney height	30 kW	-	x	-
	60, 75, 80 kW	x	x	x
	100 kW	x	x	x
	120 kW	x	x	x
	150 kW		x	
	220 kW	-	x	-

5. Installation

DANGER

Installation of the device must only be performed by an authorized professional installer following all the requirements of the authority having jurisdiction over the installation.

Incorrect installation of this boiler could result in severe personal injury, death, or substantial property damage from fire, carbon monoxide poisoning, soot or explosion.

Incorrect installation may cause premature wearing of the boiler, a fire hazard, or a danger of explosion.

Risk of explosion! An expansion tank, a relief valve and a pressure gauge must always be included in the boiler installation.

- The volume of the expansion tank must be at least 5% of the total water content of the system (boiler water content + water network content).
- The expansion tank must be directly connected to the boiler. No valves or the like are allowed between the expansion tank and the boiler.
- An open expansion tank must be installed to the highest point of the heating system whereas a membrane expansion tank should be installed to the boiler room.
- The boiler room temperature must be kept above the freezing point. The expansion tank must not ever freeze.
- The maximum pressure of the boiler systems is 1.5 bar (21.76 psi).
- The maximum temperature of the boiler water is 100°C.

WARNING

During installation, always follow official regulations, statutes, and installation instructions.

Hazardous voltage! Only an authorized electrician shall perform electric installations.

5.1. Boiler room requirements



The boiler must be installed indoors.



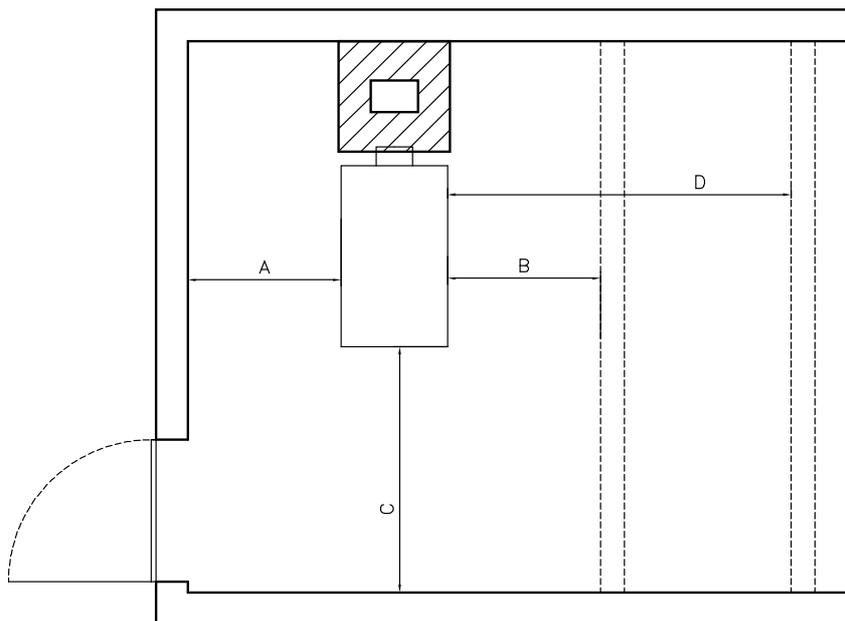
Clean the boiler room before bringing the boiler in. An unclean space is hazardous when moving the heavy boiler on its place.

The minimum requirements for the boiler room are:

- The boiler room must be built of incombustible materials and according to the national, regional and local regulations.
- The temperature of the boiler room must always remain above the freezing point 0°C.
- The boiler room must be dimensioned keeping in mind the installation, use and service of the devices included in the planned system.

The figure indicates the recommended minimum space in the boiler room.

Figure 3 Recommended minimum distances in a boiler room



- A 800 mm
- B 500 mm
- C 1000 mm
- D 2000 mm with Vetomat

- The size of the compensation air hole in the boiler room must be 1.5 x size of the chimney.
- The connections to the water network and the radiator system must be available.
- It is recommended that the boiler room is equipped with a water faucet and a drain made of cast iron.



It may be necessary to run boiling water into the drain. Boiling water melts drains made of plastic.

- Adequate fire fighting equipment must be available. The manufacturer recommends 2 x 6 kg extinguishers near the boiler room. If they are stored inside the boiler room, they may be hard to reach in case of fire.



Risk of burn! In case of fire, do not enter the boiler room without protective clothing or a smothering blanket.

5.2. Chimney requirements



Risk of carbon monoxide poisoning! The chimney must be reserved for this heating equipment only.

The minimum requirements for the chimney are:

- The chimney must be constructed according to the national, regional and local regulations, and the chimney manufacturer instructions.
- The flue must include a sweeping door and an explosion relief door.
- The height and the diameter of the chimney must be according to the chimney requirements presented in 4 *Technical data*.

NOTICE

Horizontal flue must be avoided. If this is not possible, a maximum of 1 m of horizontal flue can be used.

- Install the horizontal flue so that it slopes a little upward.
- The 1 m of horizontal flue can be compensated by adding 2 m into the chimney height.
- The horizontal flue must be isolated so that the temperature on the outer surface of the flue and chimney does not exceed 80°C.

If a steel chimney is in use, it must be:

- Acid-proof.
- Isolated so that the temperature on the outer surface of the flue does not exceed 80°C.



Risk of fire! Do not store anything on or near the chimney or the flue.

It is recommended to have a damper in the chimney. The damper makes it possible to regulate the draft.

5.3. Checking the device

- Check that the boiler delivery includes all the parts that it is supposed to. See 3 *Product description*.

NOTICE

The boiler and the cleaning rake are fastened to the pallet.

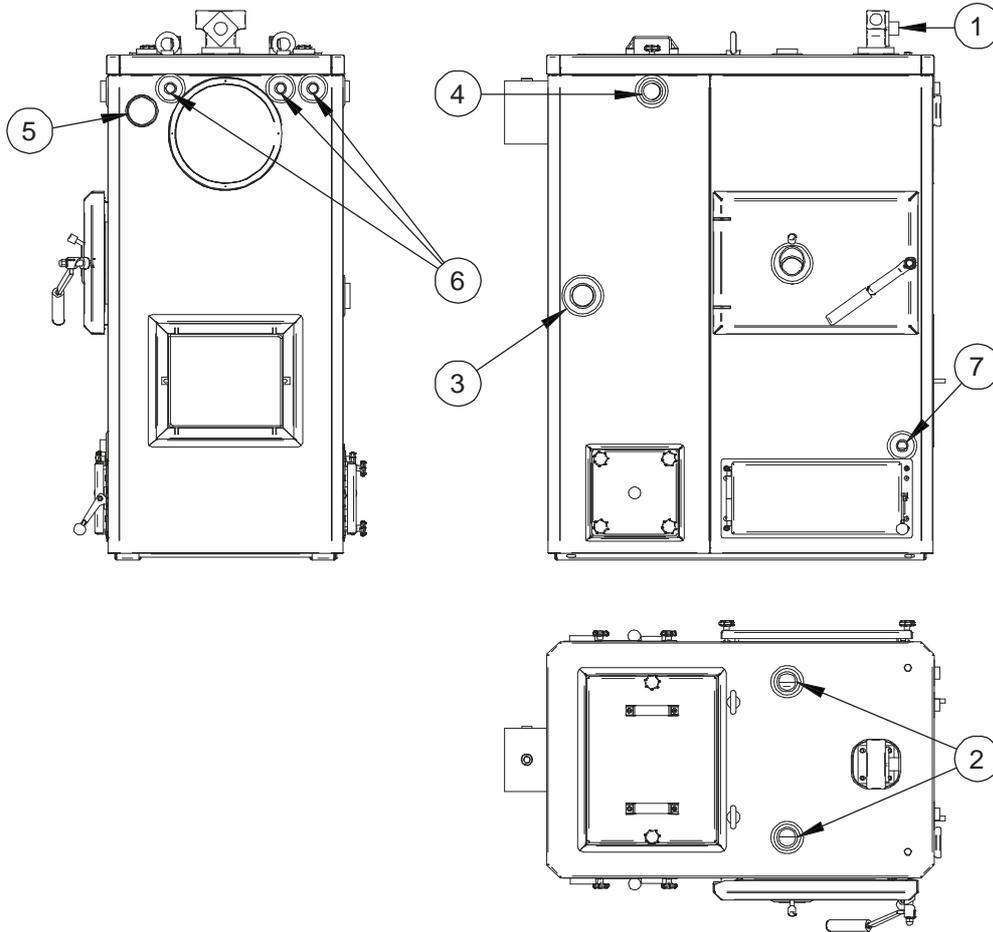
- Check that the boiler is in good condition when delivered.
 - Doors are not damaged.
 - Gaskets are in place and intact.
 - Gauges are intact.
 - The pipes of the water coil (if included in the delivery) should be straight.

If a listed part is missing or there are damages in the delivery, contact your retailer.

5.4. Boiler connections

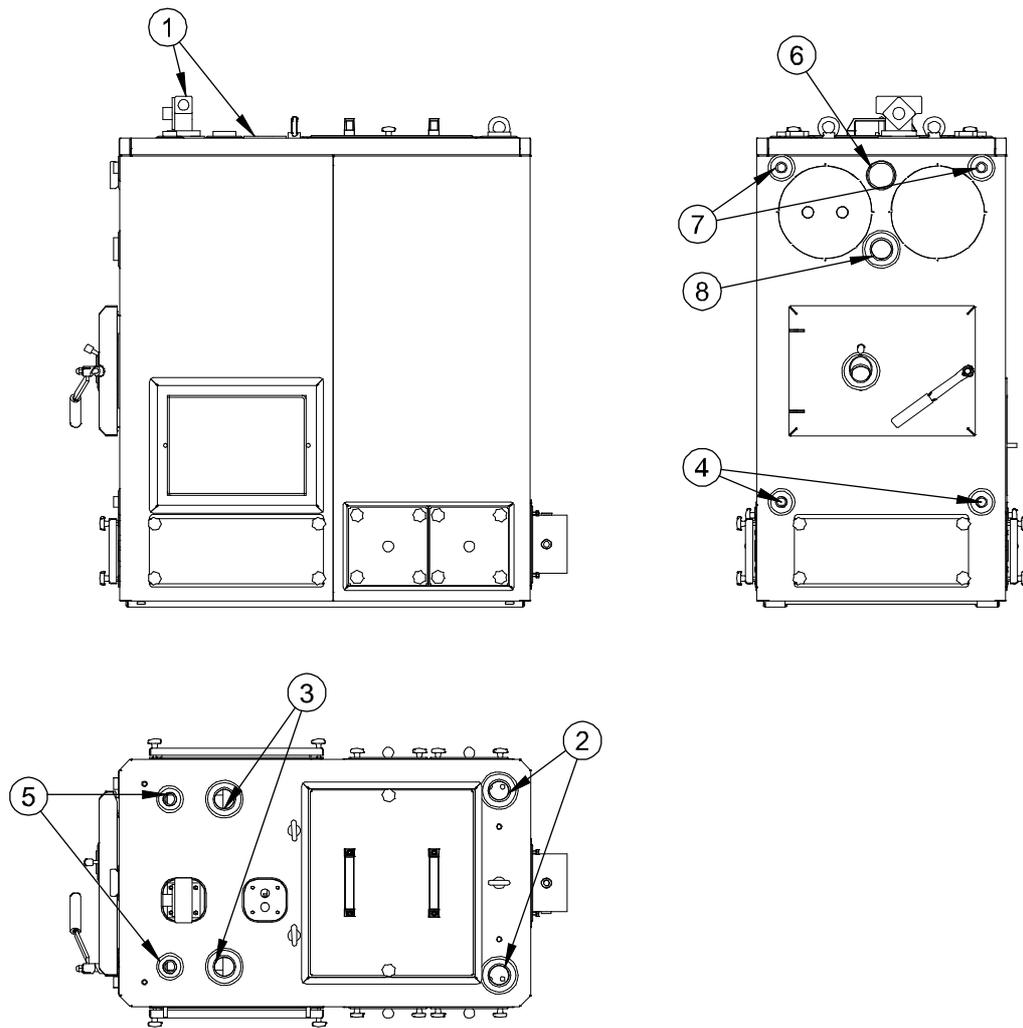
The boiler must be directly connected to the expansion tank and the relief valve. There should not be any valves between them. The figure shows the connections of a standard boiler.

Figure 4 Boiler 30 kW



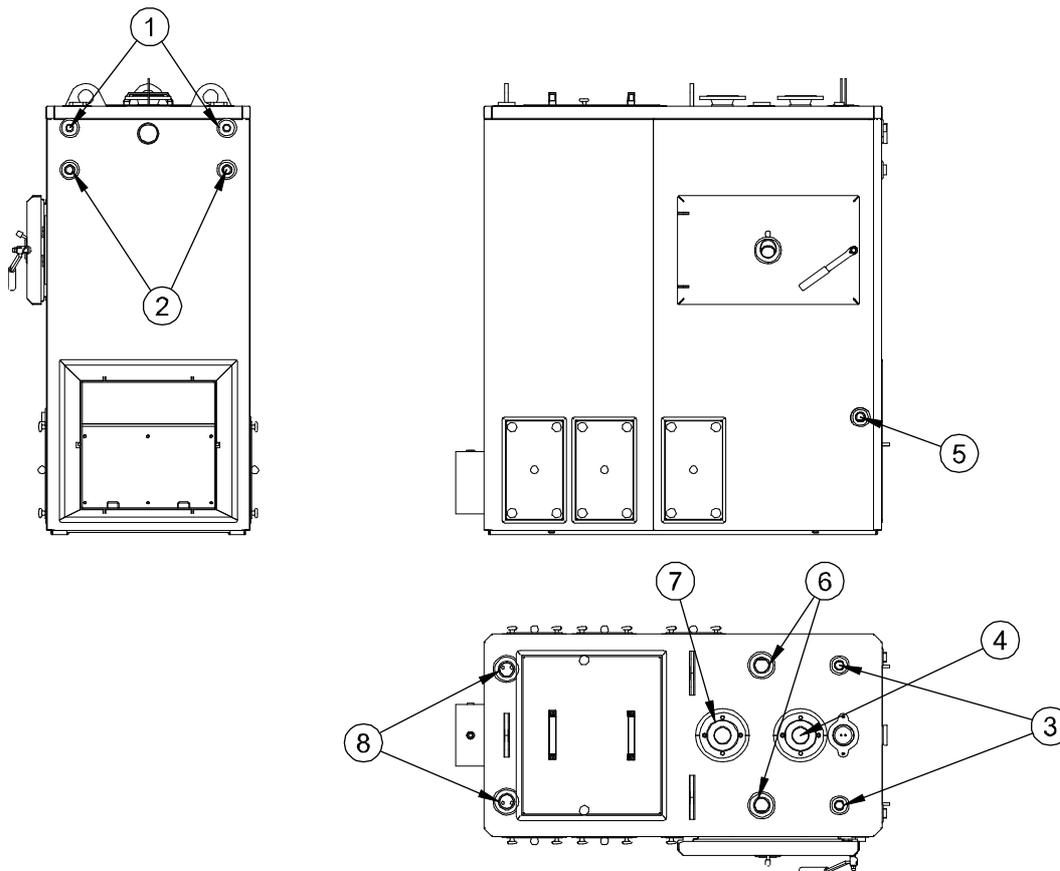
- 1 Mixing valve connection
- 2 1½-inch output water connection and expansion connection
- 3 2-inch return water connection
- 4 1½-inch return water connection
- 5 Boiler temperature gauge and pressure gauge
- 6 ¾ inch thermostat connection
- 7 ¾-inch drain valve

Figure 5 Boiler 60-120 kW



- 1 Mixing valve connection
- 2 2-inch return water connection
- 3 2-inch output water connection
- 4 Drain valve connection
- 5 3/4-inch discharging boiler connection
- 6 Boiler temperature gauge and pressure gauge
- 7 1-inch feeding and expansion connection
- 8 2-inch electric resistance

Figure 6 Boiler 150-220 kW



- 1 3/4-inch thermostat connection
- 2 1-inch thermostat connection
- 3 1-inch feeding and expansion connection
- 4 DN 65 connection, output water
- 5 Drain valve connection
- 6 2-inch discharging boiler connection
- 7 DN 65 connection, return water
- 8 2-inch output water connection

The input side and output side of the mixing valve and water coil are marked on the boiler by colored signs (input side by a blue sign). Cold water is always conveyed into the more central area inside the water tank of the boiler. This is why the connector of the input side continues as a straight pipe line into the boiler.

5.5. Installing venting

DANGER

Installation of the device must only be performed by an authorized professional installer following all the requirements of the authority having jurisdiction over the installation.

WARNING

Risk of fire and carbon monoxide poisoning! The chimney and the boiler must be connected airtight.

Risk of fire! Overpressurized boiler causes backfire.

NOTICE

There must always be underpressure in the combustion chamber.

- Check the set of flues to ensure that they do not contain any blockages. Remove the eventual blockages.

5.6. Installing plumbing

The plumbing must include an automatic deaerator.

- Water is added through topping-up valves (two valves) so that the system is full of water.

DANGER

Installation of the device must only be performed by an authorized professional plumber following all the requirements of the authority having jurisdiction over the installation.

- The boiler does not include any piping.
- The connections to the water network and the radiator system must be available in the boiler room.
- The system must have a pressure gauge. The maximum pressure of the boiler can be found from the type plate.

CAUTION

Do not install a valve or the like in the pipe between the boiler and the deaerator valve.

Do not try to adjust the deaerator valve yourself.

5.6.1. Connecting the boiler directly to the heating network

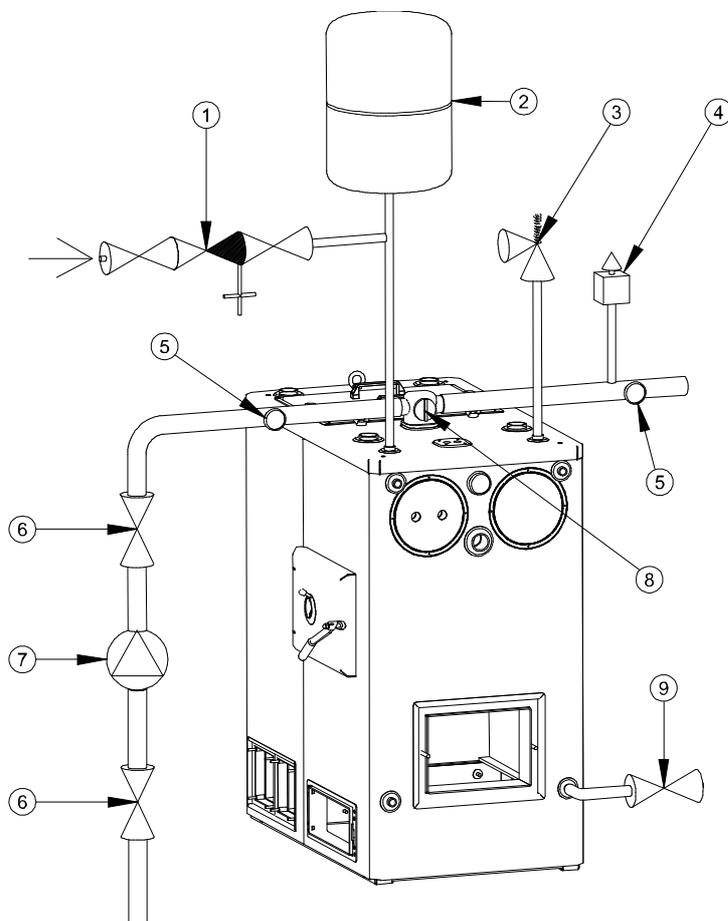
! DANGER

The volume of the expansion tank(s) must be at least 5% of the total water content of the system (boiler water content + water network content).

NOTICE

The figure is a sketch diagram; the connection between the boiler and the network varies from case to case.

Figure 7 Connecting boiler (100 kW) directly to the heating network



- 1 Filling valve
- 2 Expansion tank
- 3 Relief valve
- 4 Automatic deaerator
- 5 Thermometer
- 6 Shut-off valve (shut off with a tool)
- 7 Water pump
- 8 Four-way valve
- 9 Drain valve

A temperature gauge is installed in the output and return water pipe. The function of the boiler thermostat can be checked and adjusted by an output water gauge.

5.6.2. Connecting the boiler to the heating network through boiler connections

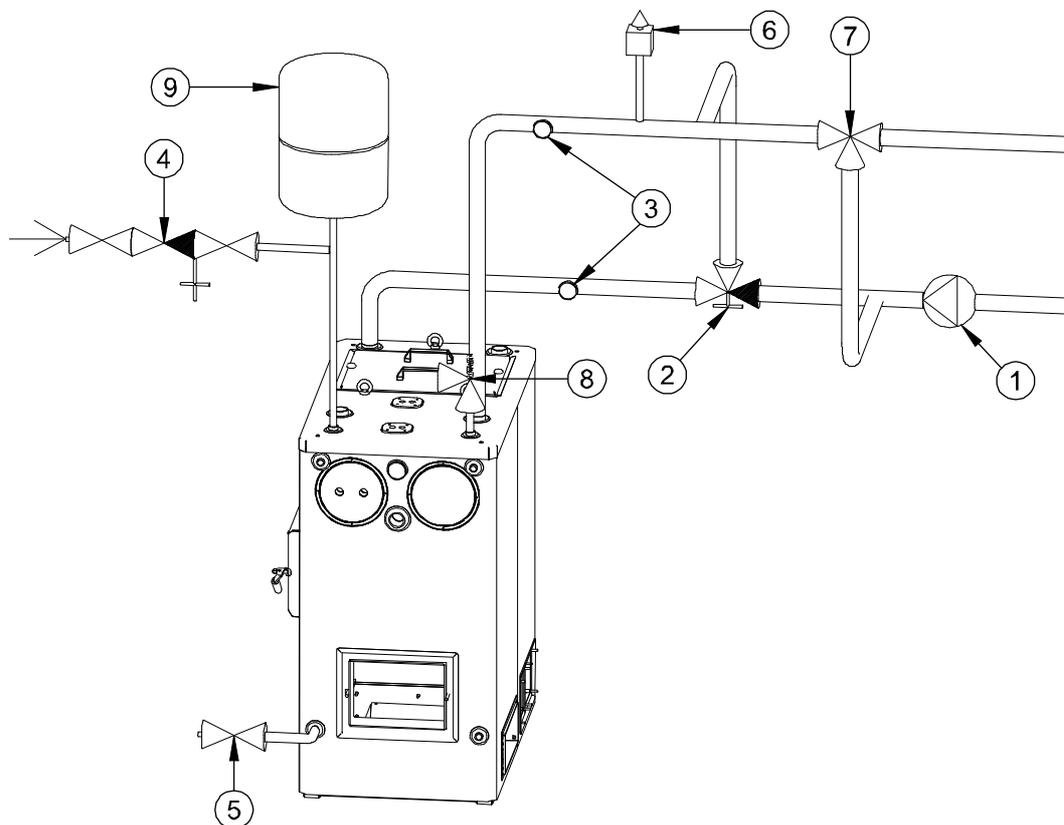


The volume of the expansion tank(s) must be at least 5% of the total water content of the system (boiler water content + water network content).

NOTICE

The figure is a skeleton diagram; the connection between the boiler and the network varies from case to case.

Figure 8 Connecting the boiler through boiler connections



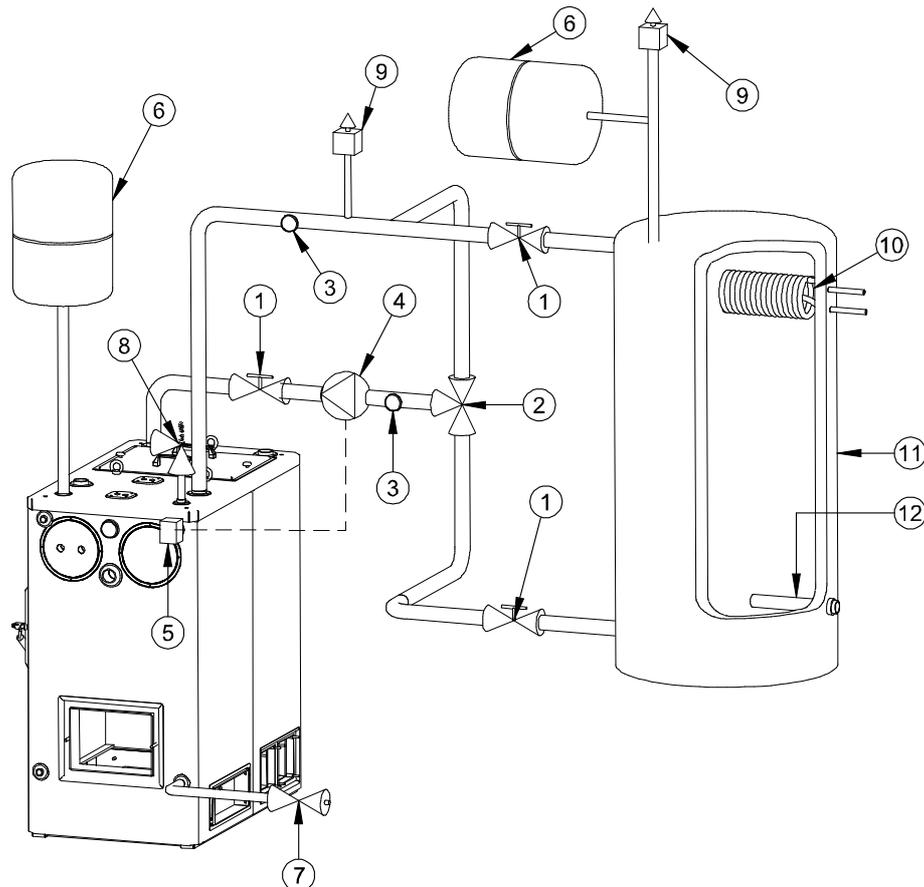
- 1 Water pump
- 2 Thermostatic mixing valve
- 3 Thermostat
- 4 Filling valve
- 5 Drain connection
- 6 Automatic deaerator
- 7 Three-way valve
- 8 Relief valve
- 9 Expansion tank

5.6.3. Connecting the boiler to a water accumulator

NOTICE

The figure is a sketch diagram; the connection between the boiler and the network varies from case to case.

Figure 9 Connection to a water accumulator



- 1 Shut-off valve (shut off with a tool)
- 2 Thermostatic mixing valve
- 3 Thermostats
- 4 Accumulator pump
- 5 Pump's control thermostat
- 6 Expansion tank
- 7 Drain valve
- 8 Relief valve
- 9 Automatic deaerator
- 10 Water coil
- 11 Water accumulator
- 12 Electric resistances

The water accumulator is connected to the connector on top of the boiler. This means that the water in the hottest part of the boiler is conveyed to the water accumulator.

The pipes between the boiler and the water accumulator (exit and return pipe, diameter DN 65) must be connected by a mixing valve, which regulates the heat of the water returning to the boiler to a temperature of 70°C. This means that the water does not flow from the boiler into the water accumulator until the temperature of the boiler reaches 80–85°C.

⚠ CAUTION

If the water returning to the boiler is colder than 70°C, it is possible that the temperature in the lower parts of the convection parts falls below the dew point. As a result, the draft becomes weaker, the boiler operates at partial capacity, and pitch starts to collect in the boiler.

Depending on the capacity of the water accumulator, the right pump must be selected.

Table 10 Selecting the right pump

	Water capacity l	Water coil	Minimum flow with nominal output	
			Δt = 10°C l/s	Δt = 20°C l/s
Veto 30	270	x	0.72	0.36
Veto 60	340	x	1.44	0.71
Veto 75	290		1.80	0.90
Veto 80	410	x	1.92	0.96
Veto 100	475	x	2.40	1.20
Veto 120	385		2.88	1.44
Veto 150	460		3.60	1.80
Veto 220	850		5.27	2.64

⚠ DANGER

The volume of the expansion tank(s) must be at least 5% of the total water content of the system (boiler water content + water network content).

An open expansion tank is an economic and practical alternative.

- An open expansion tank must be insulated. The expansion tank or the pipes leading to it must not ever freeze.
- The open expansion tank must be installed to the highest point of the heating system.

5.7. Electrical installation



During installation, always follow national, regional and local regulations, statutes, and installation instructions.

Hazardous voltage! Only an authorized electrician shall perform electric installations.

The connection diagram is delivered with the control unit.

When installing an automatic controlling system (mixing valve) use the instructions provided by the supplier.

6. Commissioning

DANGER

Risk of explosion! Make sure that the boiler is full of water. If the boiler is not full of water and it is taken into use, the boiler thermostat does not register the water temperature, which can cause an explosion.

Risk of carbon monoxide poisoning! There might come some smoke into the boiler room because the boiler water is cold and the chimney draft is poor.

NOTICE

When the device is lighted for the first time, some water may condensate on the fire surfaces and dribble to the ash chamber. Water in the ash chamber does not mean that the boiler leaks.

6.1. Before taking the boiler into use

WARNING

If the brick chimney is new, let it dry properly on a slow fire.

Risk of carbon monoxide poisoning and fire! Ensure that the connection between the boiler and the chimney is airtight.

NOTICE

An authorized professional (for example a plumber) should with the end user check the boiler before taking it to actual use.

Before taking the boiler into actual use, an authorized professional checks that:

- The relief valve functions correctly.
- The pressure in the expansion tank is correct. The prepressure is adjusted case by case.
- The expansion tank is at least 5% of the whole mass of water in the system.
- The expansion tank or the pipes leading to it are not subject to freezing.
- The open expansion tank must be installed to the highest point of the heating system.
- There are no valves between the boiler and the expansion tank.
- The pumps are operating and the flow direction is correct.
- The pipe sizes are large enough.
- The connections are leak-proof.
- The BVTs sensor is adjusted and tested.
- The water tank is filled and tested.
- The boiler thermostat is installed correctly.
- A boiler with a water coil has a mixing valve to limit the service water temperature. 40-60°C is recommended.

- The flue gas flows freely.
- All the doors of the boiler are closed.
- The boiler is filled with water.
- The safety devices are tested.
- The shut-off valves between the water accumulator and the boiler are open.
- Valves are open.

6.1.1. Preparing the heating network for use



Risk of explosion! The pressure must not exceed the structure pressure of the weakest component. The structure pressure of the boiler is 1.5 bar (21.76 psi).

1. Fill the heating network with water.
 - Remove air through the relief valve when filling the system.
 - Ensure that the boiler is full of water and the air is removed from the system.
 - Ensure that the deaerator valve opens at the correct pressure in relation to the weakest component of the network.
2. Reduce the pressure of the network for example through the drain valve of the boiler so that the pressure is the same as the prepressure of the expansion tank.
3. To remove the air that has dissolved in water, heat the boiler until the boiler water reaches the temperature of 85°C.



The control unit alarms if the temperature of the boiler water exceeds 100°C.

The system must have a pressure gauge. The maximum pressure of the boiler can be found from the type plate.

The return water temperature can be checked from the return water gauge.



The water always cools in the heating network.

7. Operation

! DANGER

Incorrect operation of this boiler could result in severe personal injury, death, or substantial property damage from fire, carbon monoxide poisoning, soot or explosion.

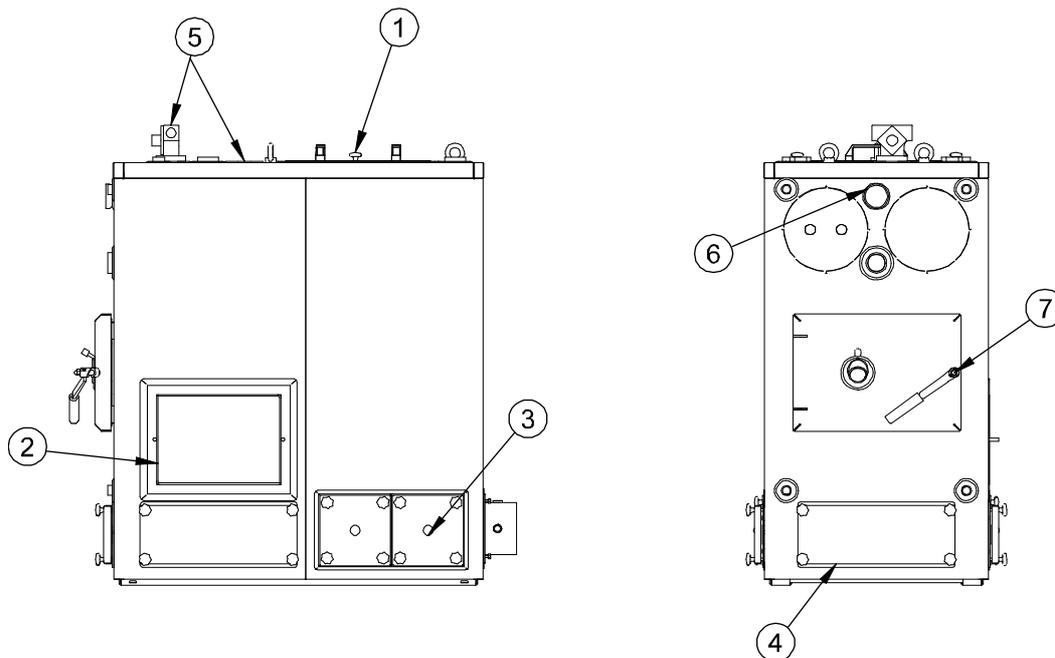
! WARNING

The boiler must only be used together with a Veto burner device and a control unit.

Only burn solid, renewable fuels accepted by the manufacturer.

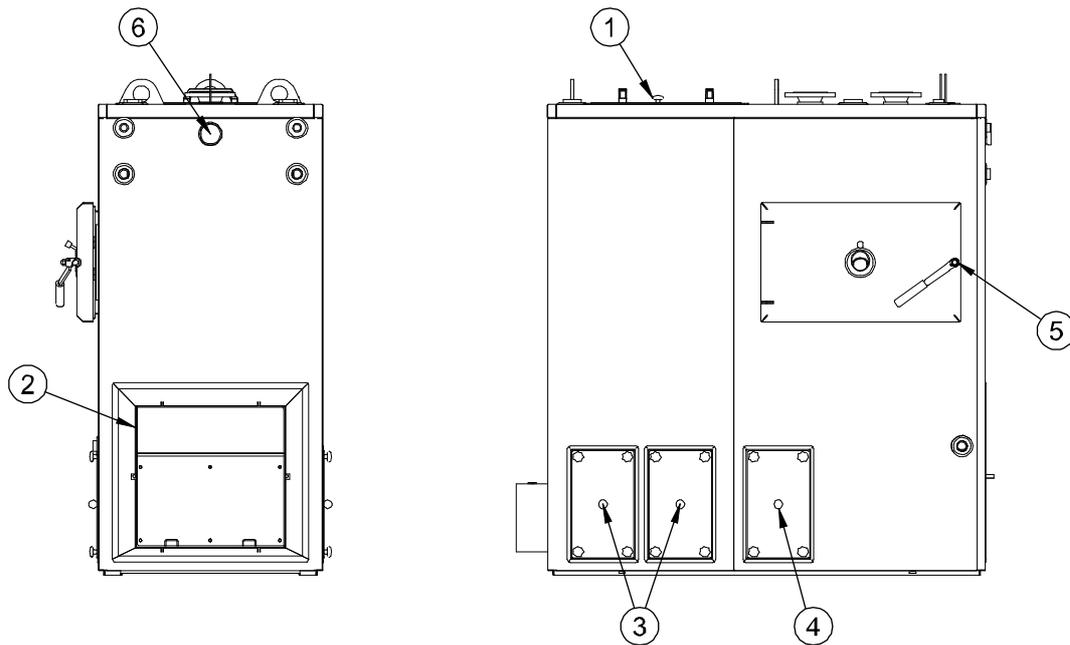
The figure shows the connections of a standard boiler.

Figure 10 Boiler 30-120 kW



- 1 Lid of the convection part
- 2 Burner head connection
- 3 Service hatch of the convection part
- 4 Combustion chamber ash box hatch
- 5 Mixing valve
- 6 Boiler temperature gauge and pressure gauge
- 7 Combustion chamber service door with an inspection opening

Figure 11 Boiler 150-220 kW



- 1 Convection part lid
- 2 Burner head connection
- 3 Convection part service hatch
- 4 Furnace ash box hatch
- 5 Combustion chamber service door with an inspection opening
- 6 Boiler temperature gauge and pressure gauge

7.1. Heating with a solid fuel burner

For instructions, see the user manual of the burner and the control unit.

7.2. Taking the boiler temporarily out of use

- Empty the ash box.
- Sweep the fire surfaces.
- Close the chimney damper.

Refer to the service chapter for more information.

8. Emergency situations

Adequate fire-fighting equipment must be available. The manufacturer recommends 2 x 6 kg dry chemical extinguishers near the boiler room. If they are stored inside the boiler room, they may be hard to reach in case of fire.

8.1. Fire in the boiler room



DANGER Risk of burn! In case of fire, do not enter the boiler room without protective clothing or a smothering blanket.

1. Switch off the power from the main switch that is located near the exit of the boiler room.
2. Always call the emergency number.

8.2. Chimney fire

- Always call the emergency number.

8.3. Boiler is overheating



WARNING Risk of explosion! Do not let cold water inside a hot boiler. It can cause an explosion. The water expands when overheated and the pressure rises in the boiler.



CAUTION Boiling water will melt plastic drains. The boiler room should be equipped with a drain made of cast iron.

1. Shut down the burner.
2. Use the water coil to remove hot water from the boiler.
3. After the boiler has cooled down, check that there is enough water in the boiler.

8.4. Overpressure in the boiler



WARNING Risk of burn! Be careful when the relief valve opens.

- If the relief valve is broken, carefully let some water flow from the emptying tap.

9. Service

DANGER

Service of the device must only be performed by an authorized professional following all the requirements of the authority having jurisdiction over the action.

Risk of burn! Before servicing, turn the operating switch to the 0 position and turn off the main switch. Let the boiler cool down sufficiently.

Risk of carbon monoxide poisoning! Service the boiler only when it is cold and contains no hot ashes. In case fire is still burning or there are embers left in the boiler when service measures are started, carbon monoxide spreads from the open service doors to the boiler room.

Risk of carbon monoxide poisoning and fire! Do not collect ash in a plastic or cardboard box. Ashes containing embers develop carbon monoxide and cause fire hazard even when collected in a container made of incombustible materials.

CAUTION

Ashes or fuel may contain constituents causing allergic reactions.

- Use appropriate protective equipment, especially respirator mask, when handling ashes or fuel.
- Use clothes and gloves made of infusible materials when servicing the boiler.

9.1. Service schedule

Table 11 Service schedule

	Daily	Weekly	Bi-weekly	Monthly	Yearly
Check the general boiler operation.	x				
Check the pressure.	x				
Check the temperature.	x				
Empty the ash box.		x			
Empty ash from the convection parts.			x		
Sweep the fire and convection parts.			x		
Check the condition of the gaskets.			x		
Sweep the flue.				x	
Sweep the chimney.					x
Check the safety devices.					x



Follow also the local authorities' rules for servicing.

9.2. Preparing for service

1. Burn all the fuel inside the burner.
2. Switch the burner off.
3. Let the burner and the boiler cool down.

Tools needed for service:

- Cleaning rake

9.3. Emptying the ash box

When taking the device in use, check the amount of ash every day. Different fuel types produce different amount of ashes. Later, empty the ash box once a week.

1. Open the combustion chamber ash box hatch.
2. Take out the ash box.



The ash box can be heavy.

3. Place the ashes in a metal container with a tight-fitting lid.

4. Clean the area underneath and around the ash box.
5. Return the ash box to its place.

9.4. Removing ashes from the boiler's convection parts

1. Remove ashes from the upper parts of the convection parts.
 - Check and sweep the convection parts through the service doors on the top of the boiler.
 - Light soot can be removed by using the cleaning rake and a sweeping brush.

2. Remove ashes from the lower parts of the convection surfaces.
 - Remove the ash box.
 - Sweep the lower part of the boiler right up to the flue connection.
 - Sweep the convection surfaces.



When sweeping, be careful not to cause damage to the temperature sensor that is located in the flue connection.

9.4.1. Disposal of ashes

- Place the ashes in a metal container with a tight-fitting lid.
- Place the closed container of ashes on a incombustible floor or on the ground, well away from all combustible materials, pending final disposal.

NOTICE

For final disposal of ashes, follow the local recommendations.

9.5. Sweeping



Always follow national, regional and local regulations for sweeping, and use professional services for sweeping the chimney even if the regulations do not require this.

Ashes or fuel may contain constituents causing allergic reactions.

- Use appropriate protective equipment such as respiration protector when handling ashes or fuel.
- Use clothes and gloves made of infusible materials when servicing the boiler.

Make sure that the boiler room is well-ventilated when sweeping.

Risk of fire! After sweeping, make sure that the service doors and the ash box are properly in place.

After sweeping always remove the ash from the ash box.

NOTICE

Soot collects on the convection surfaces more quickly than on the fire surfaces of the combustion chamber.

The fire surfaces of the combustion chamber and the convection parts must be swept regularly.

If the boiler temperature is kept low or if the fuel used is too moist it starts to collect dirt and soot.

Moisture and soot caused by the low boiler temperature prevent the heat from transferring to the boiler water and thus reduce the efficiency of the boiler.

9.5.1. Sweeping the fire surface and convection parts

If the flue gas temperature rises 50°C over a clean boiler's given value, the boiler must be swept.

1. Turn the operating switch on the control unit to BLOWER position.
2. Let the blower operate 30 min so that the device cools down.
3. Turn off the main switch.
4. Open the convection parts' hatches one at a time. When you are done with one convection part, close the hatch before opening another.

The draft of the chimney is concentrated on the hatch that is open. Ash, soot and flue gases do not spread to the boiler room when opening the hatches one by one.

5. Sweep the surfaces.
6. Remove the ash from the ash box.

9.5.2. Sweeping the chimney



Always follow national, regional and local regulations for sweeping, and use professional services even if the regulations do not require this.

Risk of fire! After sweeping, make sure that the service doors and the ash box are properly in place.

Check and sweep the convection parts through the holes on top of the boiler. Remove light soot by using a rake and a sweeping brush.

9.6. Checking the boiler door gasket

- Check the boiler door gaskets every two weeks.

9.6.1. Adjusting the boiler door gasket

The gaskets installed in the boiler doors in the factory will yield a little at first during use. The door must then be readjusted in order to make it tight again.

If the adjustment range of the adjusting screw is not sufficient, remove the filling door and turn the hinges slightly backwards.

9.6.2. Changing the boiler door gasket

1. Cut the new gasket according to the old one.
The gasket is made of glass fiber braided cord that is available in hardware stores.
2. Clean the gripping surface.
3. Use close contact glue to attach the new gasket.
4. Close the lid and let the glue dry.

9.7. Removing pitch

- Remove pitch-like dirt using chemical cleansers. These and the instructions for their use are available at your local hardware store.

9.8. Checking the relief valve

It is possible that the relief valve installed in the heating network gets stuck. This leads to excessive rise of the system pressure. Therefore, check the function of the relief valve 2–3 times a year.

- Test the relief valve by manually opening the valve. The water should flow through.

9.9. Testing the safety devices

Make sure that:

- The relief valve functions correctly.
- The pressure in the expansion tank is correct. The prepressure is adjusted case by case.
- The expansion tank is at least 5% of the whole mass of water in the system.
- The expansion tank or the pipes leading to it are not subject to freezing.
- The open expansion tank must be installed to the highest point of the heating system.
- There are no valves between the boiler and the expansion tank.
- The pumps are operating and the flow direction is correct.
- The pipe sizes are large enough.
- The connections are leak-proof.
- The BVTs sensor is adjusted and tested.
- The water tank is filled and tested.
- The boiler thermostat is installed correctly.
- A boiler with a water coil has a mixing valve to limit the service water temperature. 40-60°C is recommended.
- The safety devices are tested.

10. Troubleshooting

10.1. Boiler water is boiling

Possible cause	Solution
Faulty adjustment of the burner.	Adjust the relation between the stand-by fire and the interpulse time or the settings of the overheating protector (changeable).
The boiler thermostat is broken.	Change the boiler thermostat.
The fuel type has been changed, for example from chips to pellets.	Adjust the feeding values according to the feeding table.
The set temperature for the boiler thermostat is too high (when the boiler is on operating condition work time).	Adjust the boiler thermostat temperature to 80°C or less.
The pause time is too short (when the boiler is on operating condition pause time).	Adjust the operating condition pause time longer.

10.2. Solid fuel burner does not start

Possible cause	Solution
The overheating protector of the boiler thermostat has gone off when the temperature has risen too high during burning of wood.	Push the reset button if the temperature has fallen sufficiently low.
An alarm is active.	Check the control unit for alarm messages and follow the instructions there.

10.3. System does not produce heat even though the boiler is warm

Possible cause	Solution
There is not enough water in the boiler.	<p> WARNING Risk of explosion! Do not let cold water inside a hot boiler. It can cause an explosion. The water expands when overheated and the pressure rises in the boiler.</p> <p>When the boiler water is near boiling point, turn off the device and let it cool down completely. Add water.</p>
The circulation water pump does not rotate.	Find the cause of the malfunction of the pump. Fix it or have it fixed.
There is air in the heating network.	Bleed the air from the heating network.
The possible valve between the boiler and the piping reduces or prevents the circulation of water.	Open the valve.
The thermostat of the water accumulator pump is broken.	Replace the thermostat.

10.4. Tap water not sufficiently warm

Possible cause	Solution
The water coil is connected the wrong way round.	The coil must be reconnected by a plumber.
The boiler or the water accumulator is not warm enough.	Heat more.
A lot of water has been taken out lately.	Wait until the water becomes warm.
Mixing valve is jammed.	Change the valve.
Water piping is clogged.	Check the condition of the piping.

10.5. Smoky flame

Possible cause	Solution
Faulty adjustment of burner or its fire jet is cold.	Let the fire jet become warm or readjust.
The moisture content of the fuel is too high; no sufficient increase in the calorific value.	Change the fuel.
The temperature of the boiler is low for too long.	Faulty connection of the water accumulator. <i>See 5.6 Installing plumbing.</i>
The burner does not get air.	Clean the burner and the blower according to the user manual. Readjust the feeding and blowing intervals according to the feeding table.

10.6. Weak draft in the flue

Possible cause	Solution
The junction between the boiler and the flue is not airtight.	Seal it up using for example mineral wool.
There is a blockage in the flue outlet.	Open the blockage.
The sweeping door in the flue is left open.	Close it tightly.
Moist and cold chimney.	Burn paper in order to warm up the chimney.
There is partial vacuum in the building and the flow of air in the flue goes in the wrong direction.	Shut the doors and other holes (from which the suction comes) in the boiler room.
The moisture content of the fuel is too high.	Change the fuel or add dry fuel.
The boiler is situated far from the chimney, the aggregate is too long in the horizontal plane.	The flue must be made to rise slightly.

Table 12 Veto 30 spare parts

No.	Name	Item
1	Knob	68536
2	Lid	47334
3	Wool cover	47318
4	Wool cover gasket	47327
5	Lifting eye nut M16	74801
6	Mixing valve	68540
7	Mixing valve gasket	68541
8	Pressure gauge and thermometer	68335
9	Ash box hatch	47325
	Ash box hatch, ash screw	35003
10	Handle	34604
11	Cover plate	47368
12	Water coil	42954-1
13	Water coil inlet	68361-2
14	Water coil gasket	68271
15	Water coil flange gasket	68270
16	Water coil cover with holes	41938-1
17	Included in no. 13	68361-1
18	Service door, left	35514
	Service door, right	35496
19	Ash box door, right	35025
	Ash box door, left	35085
	Ash box hatch, ash screw	35425
	Ash box hatch, blind	35436
	Ash box hatch	47387
20	Gasket, small service door	48581
21	Ash box (30-100 kW)	48106
22	Ash box hatch (30 kW), right	35025

Figure 13 Veto 60, 80, 100 spare parts

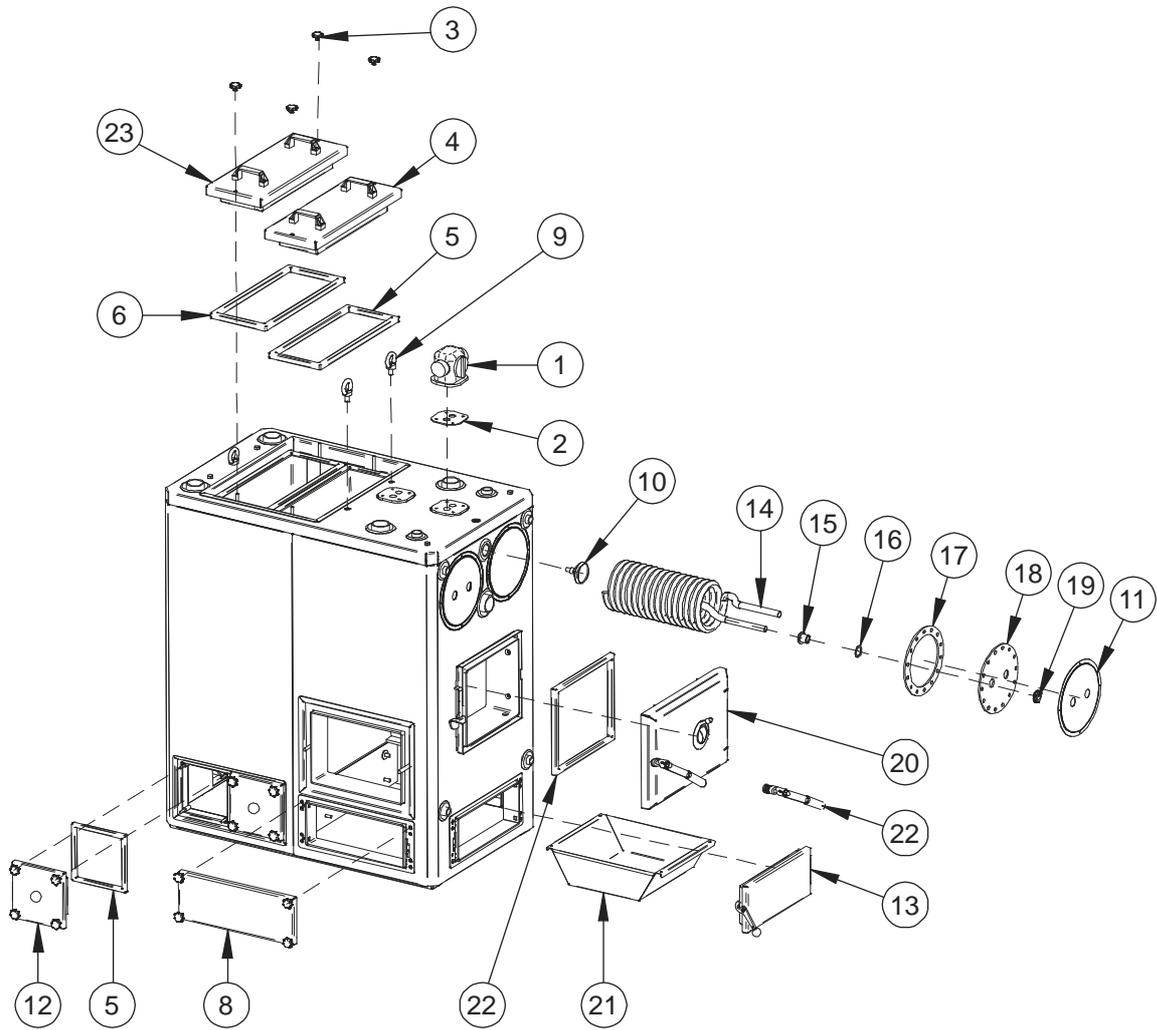


Table 13 Veto 60, 80, 100 spare parts

No.	Name	Item
1	Mixing valve	68541
2	Mixing valve bottom gasket	68541
3	Knob	68536
4	Lid, 60/80 kW	36663
	Lid, 100 kW	36680
5	Wool cover	47318
6	Wool cover	47936
7	Wool cover	47935
8	Ash box hatch, right	35025
	Ash box hatch, left	35085
	Ash box hatch, ash screw	35425
	Ash box hatch, blind	35436
	Ash box hatch	47387
9	Lifting eye nut M16	74801
10	Pressure gauge and thermometer	68335
11	Cover plate	47368
12	Ash box hatch, blind	47325
	Ash box hatch, ash screw	35003
13	Service door, right	35025
14	Water coil	42954-1
15	Water coil inlet	68361-2
16	Water coil gasket	68271
17	Water coil flange gasket	68270
18	Water coil cover with holes	4-1938-1
19	Included in no. 15	68361
20	Service door, left	35514
	Service door, right	35496
21	Ash box (30-100 kW)	48106
22	Wool cover	48581
23	Lid, 60/80 kW	36657
	Lid, 100 kW	36681

Figure 14 Veto 75 and 120 spare parts

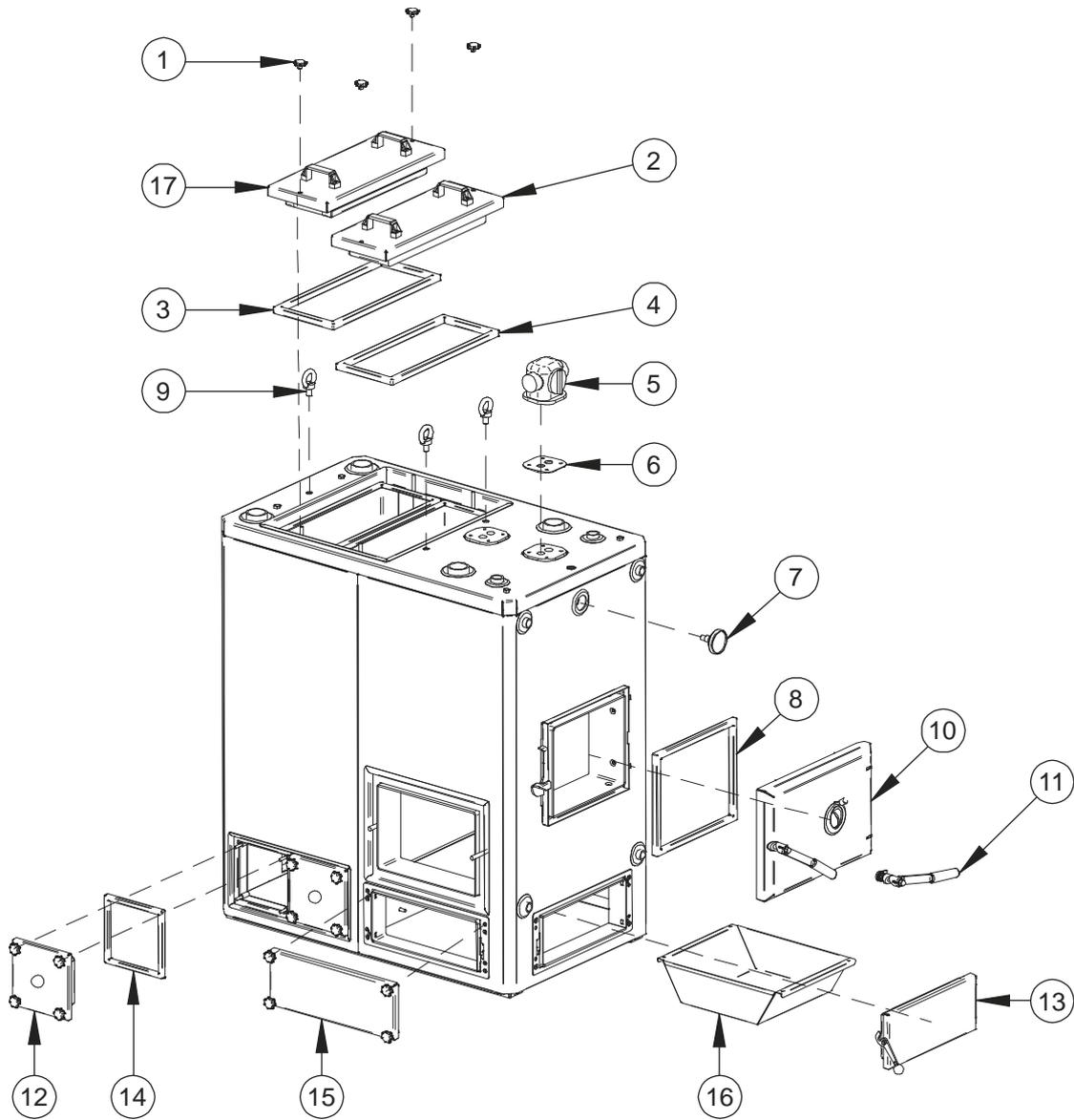


Table 14 Veto 75 and 120 spare parts

No.	Name	Item
1	Knob	68536
2	Lid, 75 kW	36663
	Lid, 120 kW	36680
3	Wool cover	47936
4	Wool cover	47935
5	Mixing valve	68541
6	Mixing valve bottom gasket	68541
7	Pressure gauge and thermometer	68335
8	Wool cover	48581
9	Lifting eye nut M16	74801
10	Service door, left	35514
	Service door, right	35496
11	Handle	34604
12	Ash box hatch short	47325
	Ash box hatch, ash screw	35003
13	Service door, right	35025
14	Wool cover	47318
15	Ash box hatch, right	35025
	Ash box hatch, left	35085
	Ash box hatch, ash screw	35425
	Ash box hatch, blind	35436
	Ash box hatch	47387
	Ash box (30-100 kW)	48106
17	Lid, 75 kW	36657
	Lid, 120 kW	36681

Figure 15 Veto 150 spare parts

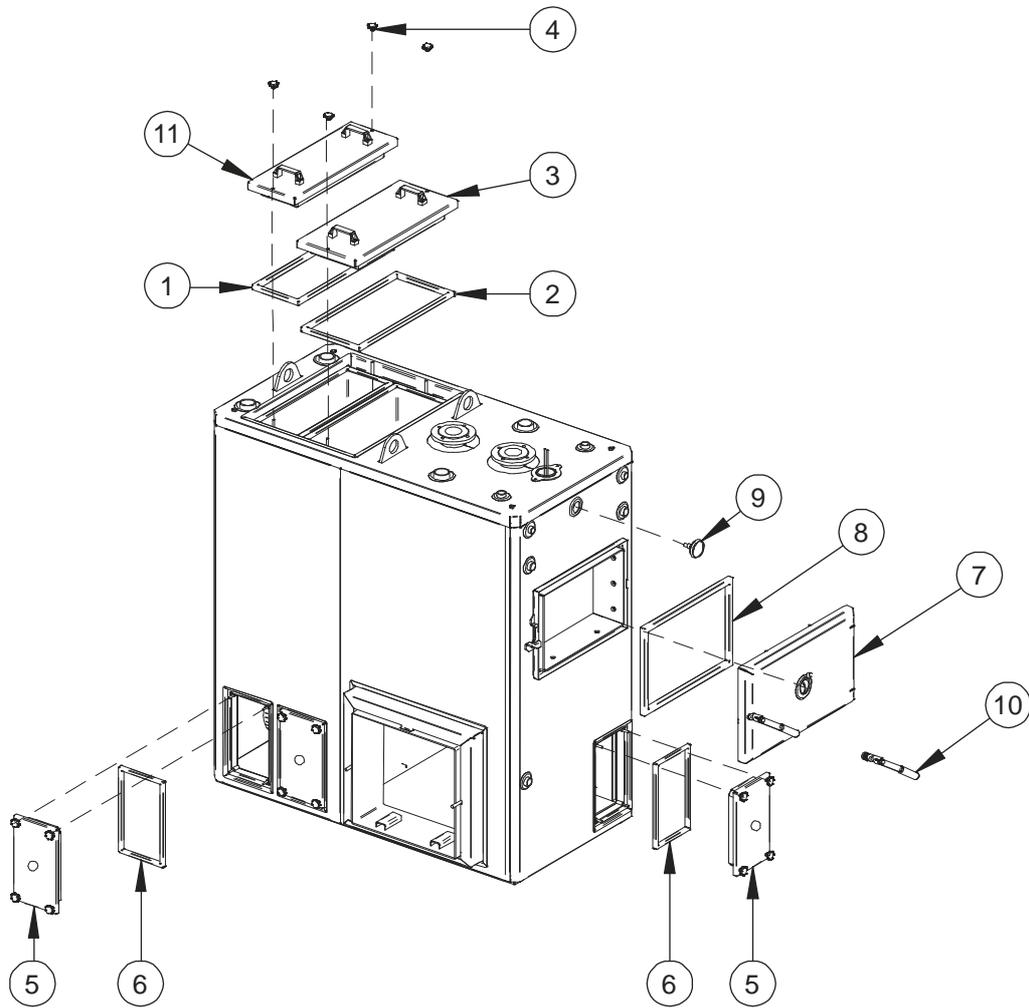


Table 15 Veto 150 spare parts

No.	Name	Item
1	Wool cover	48148
2	Wool cover	48212
3	Lid	36706
4	Knob	68536
5	Ash box hatch	35424
	Ash box hatch, blind	35951
	Ash box hatch	36189
6	Wool cover	48505
7	Service door, right	35484
	Service door, right	34600
	Service door, left	34332
	Service door, left	35494
8	Wool cover	45776
9	Pressure gauge and thermometer	68335
10	Handle	34604
11	Lid	36681

Figure 16 Veto 220 spare parts

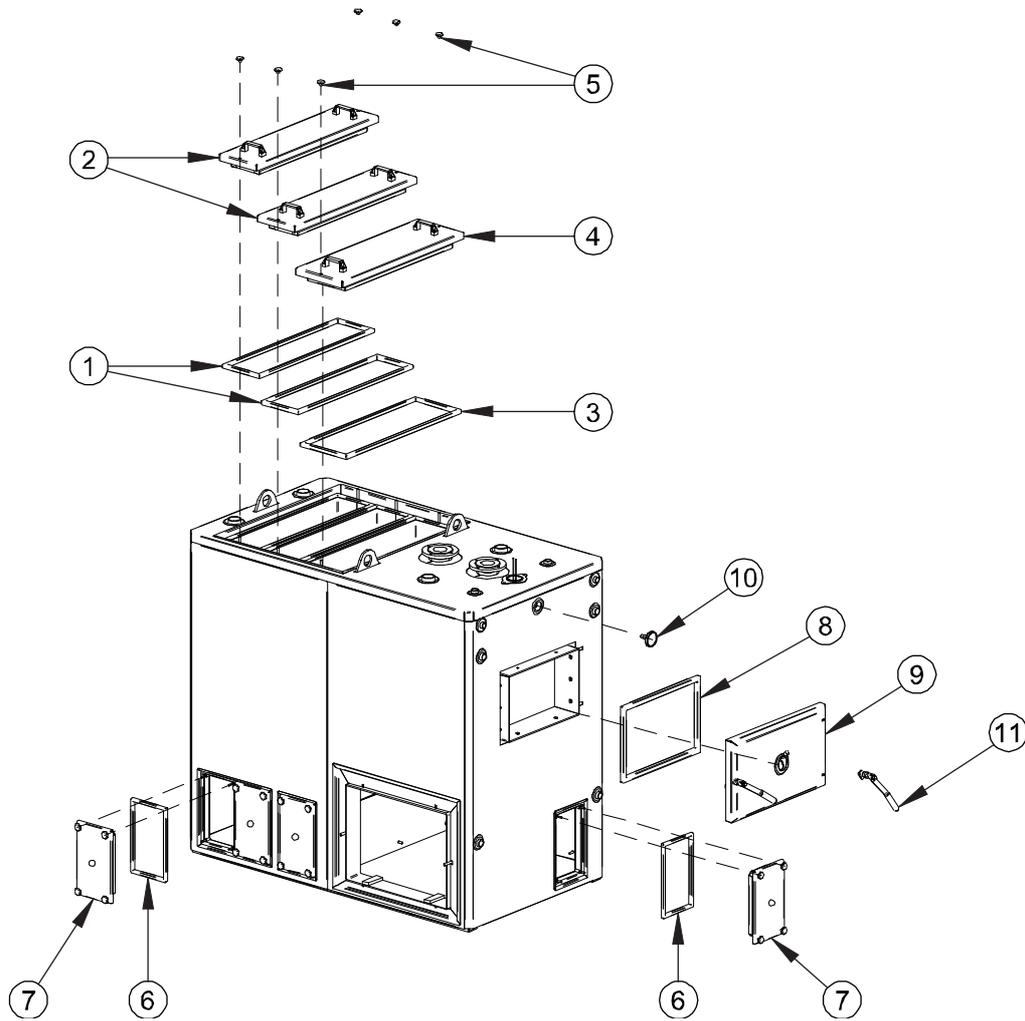


Table 16 Veto 220 spare parts

No.	Name	Item
1	Wool cover	48260
2	Lid	35949
3	Wool cover	48261
4	Lid	35947
5	Knob	68536
6	Wool cover	48505
7	Ash box hatch	35424
	Ash box hatch, blind	35951
	Ash box hatch	36189
8	Wool cover	45776
9	Service door, right	35484
	Service door, right	34600
	Service door, left	34332
	Service door, left	35494
10	Pressure gauge and thermometer	68335
11	Handle	34604

12. Disposal of the boiler

When used and serviced properly, the boiler will serve you for a long time. In time it will, however, become unprofitable to maintain and thereby be disposed of.

The boiler device contains:

- Electronic parts (sensors)
- Steel

Deliver the boiler device to a waste treatment plant where it is taken to pieces and the parts are recycled in an appropriate way.

13. Glossary

Term	Explanation
Heating network	The network where the heating water flows. Includes piping, radiators, valves, and a water accumulator.
Heating system	The heating system includes the heating network and also a boiler and a feeding device.

