

# **Instruction manual**



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## WE HOPE THAT YOU ARE SATISFIED WITH OUR PRODUCT AND WE KINDLY RECOMMEND YOU TO FOLLOW THESE MAIN RULES IMPORTANT FOR A LONG SERVICE LIFE AND THE CORRECT FUNCTIONALITY OF THE BOILER

1. Installation, ignition test and operator's training **will be carried out by an installation company trained by the manufacturer**. This company also completes a boiler installation report (p.28).
2. During the **gasification process, wood tar and condensates (acids)** form in the fuel storage tank. Therefore, there must be a thermoregulatory valve installed behind the boiler or an electronically controlled three-way valve on the return piping in order to keep the **minimum temperature of water returning to the boiler at 65°C**. **Operating temperature** of water in the boiler must be in the **80-90°C** range.
3. The boiler **must not be permanently** operated in an output **lower than 50%**.
4. Operation of every circulating pump in the system must be regulated by an individual thermostat in order to keep the **specified minimum temperature of water returning to the boiler**. The boiler-circuit pump shall be switched on and off by means of a thermostat built in the boiler (set to 70°C).
5. The boiler operates environmentally friendly if working at the nominal output level.
6. We therefore recommend installing the boiler with **accumulating storage tanks, which provides 20 - 30% fuel consumption decrease, longer service life of both – the boiler and the chimney, and user-friendlier operation**.
7. If you cannot install the boiler with accumulation tanks of required volume, then we require that you install at least **one equalising tank**; the volume of which should be 1000 l.
8. When operating the boiler in a **lower-output mode** (summer operation or heating up hot potable water), it is **necessary to fire-up daily**.
9. Use only **dry fuel with 12 - 20% moisture content – 2 years old**.



**CAUTION - If the boiler is installed with a TV 60°C thermoregulatory valve or with an electronically controlled three-way valve for keeping the min. temperature of water returning to boiler at 65-70°C in combination with accumulation storage tanks (see the schematics), the guarantee period for the boiler drum is extended from 24 to 36 months. The guarantee period for other parts remains 2-year long. In non-compliance with these principles, the drum's and the heatproof shaped pieces' service life may dramatically decrease due to low-temperature corrosion. The boiler drum may corrode in as little time as 2 years.**

## 1. Intended use

The environmentally friendly boiler ATMOS DC 100 is intended for heating in gardening centres, large houses, various workshops, business premises and similar buildings. The boiler is suitable for outputs ranging between 50 – 99 kW.

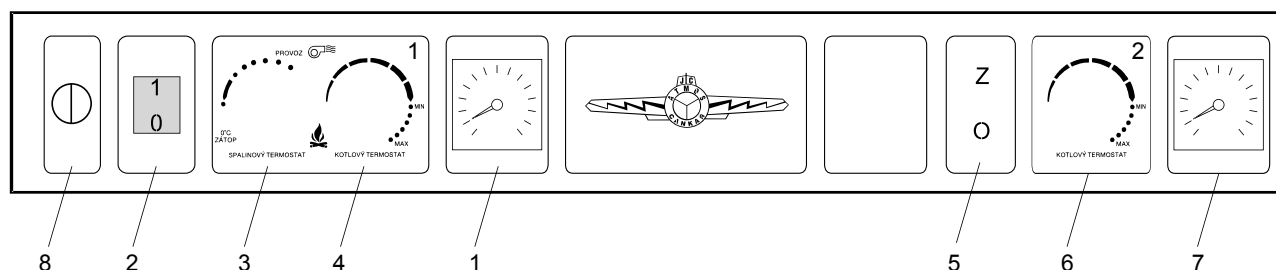
The boiler is designed for burning wood pieces only. Any dry wood may be used for heating. Wood logs and wood splits of 750-mm maximum length in particular. Larger diameter logs may be used as well; then the boiler's nominal output decreases and the combustion time increases. The boiler is not intended for burning saw dust or small-particle wood waste. These can be burnt in small quantities only, together with log-firewood. MAX. 20%.

Due to their huge feeding hopper, it saves the user a lot of laborious wood splitting and treating operations. It saves both - the physical effort and also the time dedicated to these operations. Wood briquettes can be burnt as alternative fuel. We however recommend burning them together with log firewood. Ratio 1:1.

## 2. Technical description

The boiler is designed in a manner providing so called generator gasification wood burning method. It utilises extraction ventilators which blow air into the boiler. The boiler drum is manufactured as a welded structure of 3-8 mm thick steel sheets. The boiler consists of a fuel-feeding hopper which is in the lower section fitted with a heatproof (fireclay) shaped piece with a longitudinal opening allowing the waste gasses and fumes to escape. The burn-off chamber situated underneath is fitted with other heatproof (fireclay) shaped pieces. There is a vertical flue-gas duct in the back of the boiler body which is in the upper section equipped with an ignition valve. A gas outlet pipe for a chimney connection is situated in the upper part of the flue-gas duct. The boiler's front wall is fitted with a loading door (in its upper section) and an ash-pan door (in the lower section). Lids are placed on both sides of the ash-pan door. A tube heat exchanger is situated behind these lids. In the front section of the upper hood there is an ignition valve pulling rod. The boilers' drum is externally heat insulated by mineral wool placed beneath the sheet metal covers of the boilers' external housing. A control panel for electromechanical regulation is situated in the upper part of the boiler. In the rear section of the boilers, there is a primary and secondary air feeding duct fitted with two ventilators. The primary and secondary air is pre-heated to a high temperature.

## Control panel appearance



- |   |   |
|---|---|
| 1. Outgoing water thermometer                   | 5. Ignition valve control                       |
| 2. Main switch                                  | 6. Operating thermostat of the ventilator No. 2 |
| 3. Waste gas thermostat                         | 7. Pressure gauge                               |
| 4. Operating thermostat of the ventilator no. 1 | 8. Safety thermostat                            |

### Description:

- Thermometer** – indicates the temperature of water exiting the boiler
- Main switch** – used to completely shut down the boiler
- Waste gas thermostat** – is used to switch off the ventilators when the waste gas temperature drops – after the fuel has burnt out. The boiler-circuit pump stops operating simultaneously with the ventilators.



**CAUTION** – when firing up (igniting), set the waste gas thermostat to („0°C“ - firing-up). After flaring up, set the waste gas thermostat to „operation“ position. The user needs to determine the optimal operating position for particular conditions. Should the waste gas temperature fall below the preset value, the thermostat switches the ventilator off. If you want the ventilator to start operating again, set a lower temperature on the waste gas thermostat (e.g. set it to „0°C“ - firing-up).

- Control thermostat no. 1 (boiler thermostat)** – controls the first ventilator operation depending on the temperature of water exiting the boiler. Set it to temperature of 85 -90°C.
- Ignition valve pulling-rod** – is used for opening up the ignition valve during ignition or fuel-loading stage.
- Control thermostat no. 2 (boiler thermostat)** – controls the second ventilator operation depending on the temperature of water exiting the boiler. Set it to temperature of 80 - 85°C.
- Pressure gauge** – indicates the current pressure of water in boiler.
- Safety irreversible thermostat** – serves as boiler protection against overheating in case of control thermostat failure or as an indication of exceeding the emergency temperature. If such exceeding occurs, it is then necessary to depress the thermostat.

## Advantages of the boilers

The burning happens at very high temperatures with a generator-gasification function. This feature means fuel savings and environmentally friendly operation. The boilers have the primary and secondary air pre-heated to a high temperature. Therefore, they are characterised by a warm and stable flame with consistent combusting quality. The large feeding hopper allows burning of large wood logs and splits up to 750 mm max. length. It is also possible to burn large-sized wood waste. The boiler is fitted with a cooling loop protecting it against overheating and with two thermostats for switching the boiler-circuit pump. The boiler was awarded a „Environmentally Friendly Product“ mark.

### 3. Technical data

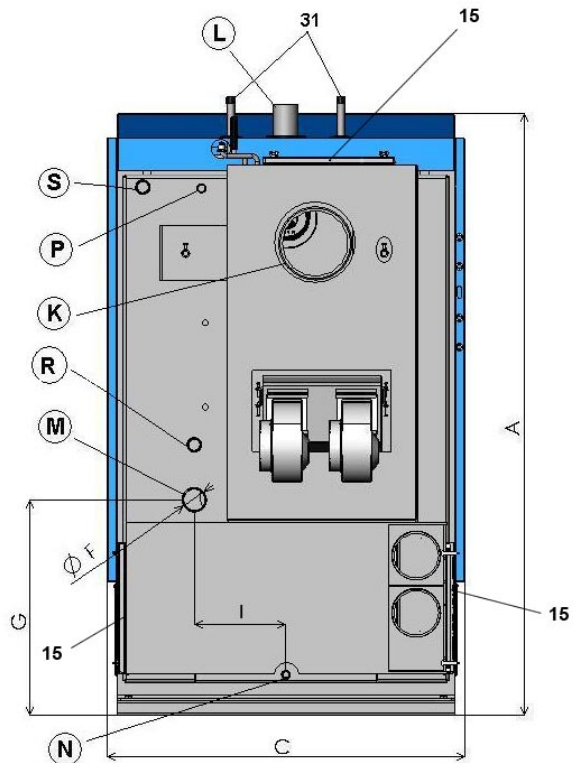
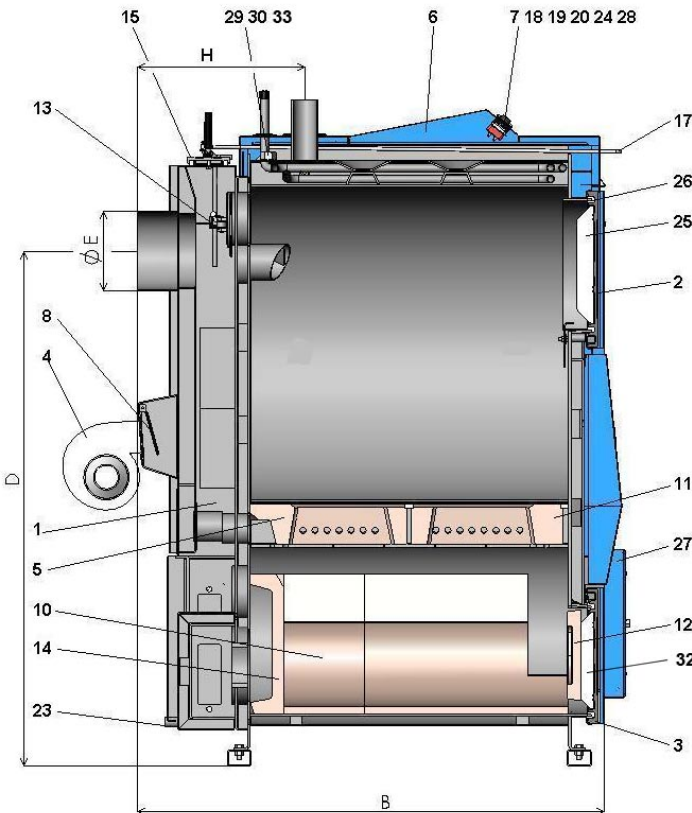
ATMOS boiler type		DC100
Boiler output	kW	99
Heating surface	m <sup>2</sup>	7
Fuel shaft volume	dm <sup>3</sup>	400
Feeding hole dimensions	mm	450 x 315
Specified chimney draught	Pa	35
Max. operating water-pressure	kPa	250
Boiler weight	kg	780
Gas-outlet pipe diameter	mm	200
Boiler height	mm	1590
Boiler width	mm	980
Boiler depth	mm	1180
Electric parts ingress protection	IP	20
Electric input	W	100
Boiler efficiency	%	89
Boiler class		3
Waste gas temperature at nominal output	°C	220
Waste gas combustion products flow weight at nominal output	kg/s	0,050
Specified fuel		Dry wood of 15 - 17 MJ.kg-1 caloric power, 12% - 20% (max.) water content and 80 – 150 mm diameter.
Average fuel consumption	kg.h <sup>-1</sup>	26
Fuel consumption per heating season		1 kW = 1 stacked cubic meter
Maximum wood length	mm	750
Combustion time at nominal output	hours	4
Boiler water volume	l	294
Hydraulic pressure drop	mbar	0,27
Equalising tank minimum volume	l	1000
Connecting voltage	V/Hz	230/50
<b>Specified min. temperature of water returning to boiler is 65°C when in operation.</b>		
<b>Specified boiler operating temperature is 80-90°C.</b>		

### Technical data

Dimensions	DC100
<b>A</b>	1590
<b>B</b>	1180
<b>C</b>	980
<b>D</b>	1260
<b>E</b>	200
<b>F</b>	2"
<b>G</b>	550
<b>H</b>	320
<b>I</b>	250

## Boiler drawing key

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Boiler drum</li> <li>2. Loading door</li> <li>3. Ash-pan door</li> <li>4. Ventilator</li> <li>5. Heatproof shaped piece – rear nozzle</li> <li>6. Control panel</li> <li>7. Safety thermostat</li> <li>8. Control valve</li> <li>10. Heatproof shaped piece – spherical chamber</li> <li>11. Heatproof shaped piece – front nozzle</li> <li>12. Heatproof shaped piece - crescent</li> <li>13. Ignition valve</li> <li>14. Flame</li> <li>15. Cleaning lid</li> <li>16. Heatproof shaped piece – rear face</li> <li>17. Ignition valve pulling rod</li> <li>18. Thermometer</li> <li>19. Ventilator no. 1 thermostat</li> <li>20. Switch</li> <li>22. Door lock</li> <li>23. Filling-in valve</li> </ol> | <ol style="list-style-type: none"> <li>24. Ventilator no. 2 thermostat</li> <li>25. Door filling – Sibral - large</li> <li>26. Door sealing – cord 18 x 18</li> <li>27. Cleaning lid</li> <li>28. Waste gas thermostat</li> <li>29. Pump thermostat - 70°C</li> <li>30. Pump thermostat – safety - 95°C</li> <li>31. Cooling loop protecting against overheating</li> <li>32. Door filling – Sibral - small</li> <li>33. Capacitor</li> </ol> <p>K – the flue-gas duct neck<br/> L – the boiler water outlet<br/> M – the boiler water inlet<br/> N – filling valve pipe sleeve<br/> P – sleeve for a sensor of the valve which regulates the cooling loop (TS 130, STS 20)<br/> S – spare output (such as for an expansion tank or a water heater)<br/> R – spare output (such as for an expansion tank or a water heater)</p> |
|--|---|

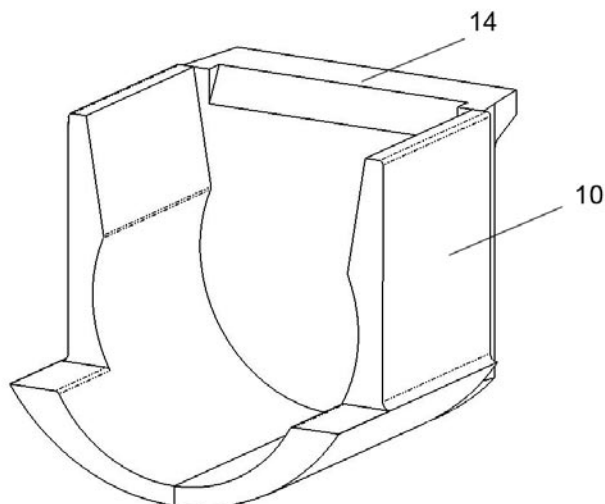




## 4. Type and seating of shaped pieces into combustion area

3. For type:

DC100



The spherical chamber must be assembled in a way that ensures that the front face of the piece /10/ is 3 cm away from the front edge of the boiler frame. The left and right side of the spherical chamber consist of two pieces.



**CAUTION – in case of handling necessity do not turn the rear face**

## 5. Boiler supplied accessories

Steel brush with accessories	1 pc
Pokers	2 pc
Filling-in valve	1 pc
Operating and maintenance instructions manual	1 pc
Ash-pan	1 pc
Flue-gas duct	1 pc

## 6. Fuel

The specified fuel is dry split logwood of 80 – 150 mm diameter, at least 2 years old, with moisture content of 12% to 20%, 15 - 17 MJ.kg-1 caloric power and maximum length 750 mm. As an alternative, it is also possible to burn large pieces of wood-waste in combination (max. 10%) with logs.

### Basic wood burning data

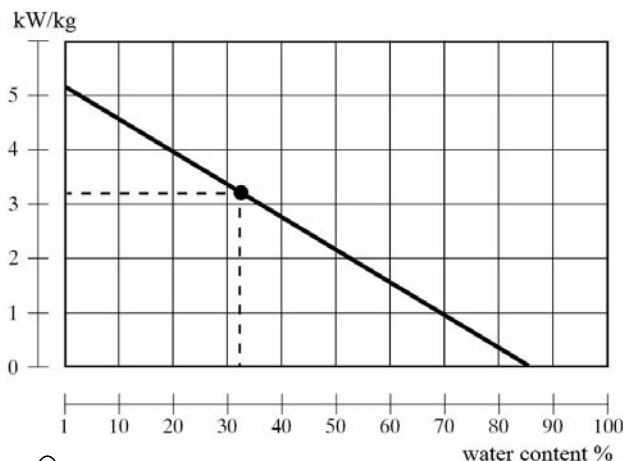
You can ensure maximum output and a long service life if you burn wood which has been left for at least 2 years to dry. The following graph illustrates the relationship of moisture content to heating capacity of the fuel. The energy content declines dramatically with increased water contents.

Example:

Wood with 20% moisture contents has thermal power of 4 kWh /1 kg of wood

Wood with 60% moisture contents has thermal power of 1.5 kWh /1 kg of wood

- Example – spruce wood which has been stored for 1 year under shelter – see graph



The graph illustrates the boilers maximum output with wet fuel.

DC100 - kW 80



Boilers are not suitable for burning wood with moisture content lower than 12%.

### Fuel heating capacity

Wood - type	Heating capacity per 1 kg		
	kcal	kJoule	kWh
Spruce	3900	16250	4,5
Pine	3800	15800	4,4
Birch	3750	15500	4,3
Oak	3600	15100	4,2
Beech	3450	14400	4,0

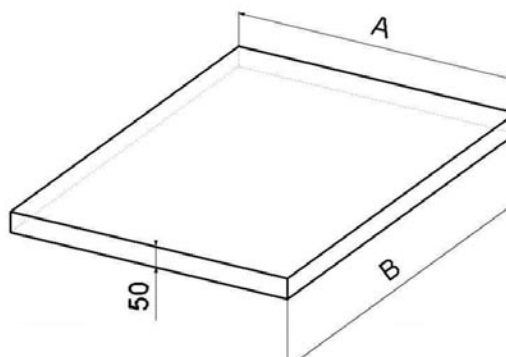


Raw wood does not burn easily, produces a lot of smoke and substantially decreases the service life of your boiler and chimney. Boiler output drops as low as 50% and fuel consumption doubles.

## 7. Boiler base

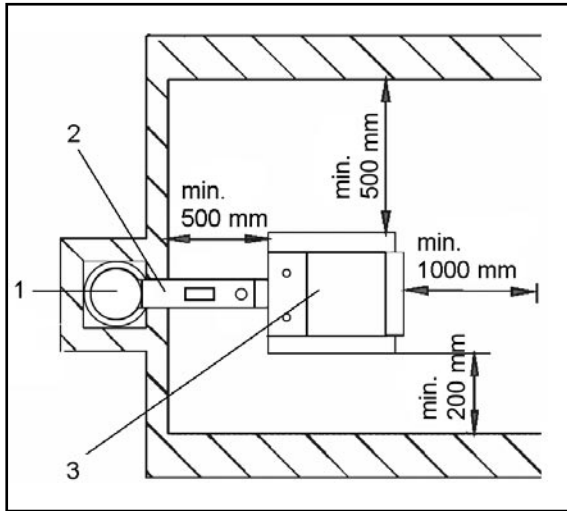
We recommend providing a concrete (metal) base under the boiler.

Boiler type [mm]	A	B
DC100	1000	1000



## 8. Environment type and boiler placement in a boiler room

Boilers may be used in a “basic environment” - AA5/AB5 as specified in Czech standard ČSN3320001/1995. Boilers must be placed in a boiler room with sufficient air access necessary for combustion. Placing boilers in living areas (including halls/corridors) is not permitted. The combustion air inlet aperture in the boiler room must be of minimum 350 cm<sup>2</sup>.



- 1 – Chimney
- 2 – Flue-gas duct
- 3 - Boiler

## 9. Chimney

**Connecting the appliance to the chimney vent stack must always be carried out with the permission of the appropriate chimney authority.** The vent stack must always be capable of providing sufficient draught and it must discharge the waste gas into the open atmosphere in a reliable manner for all possible operating conditions. The dimensions of the individual vent stack must be correct to ensure good functionality of the boiler; **because the draught influences combustion, performance and the service life of the boiler.** The chimney draught is directly dependent on its cross-section, height and the inner wall ruggedness. It is not permitted to connect another appliance into a chimney into which a boiler is connected. **The chimney diameter must not be smaller than the boiler outlet (min. 200 mm).** The chimney draught must comply with the specified values. It must however not be excessively high, otherwise the boiler effectiveness is decreased and the combustion is affected (the flame “breaks”). In case of excessive draught, install a throttle valve in the flue-gas duct between the boiler and the chimney.

Indicative values of the chimney cross-section dimensions:

20-cm diameter height 10 m

25-cm diameter height 8 m

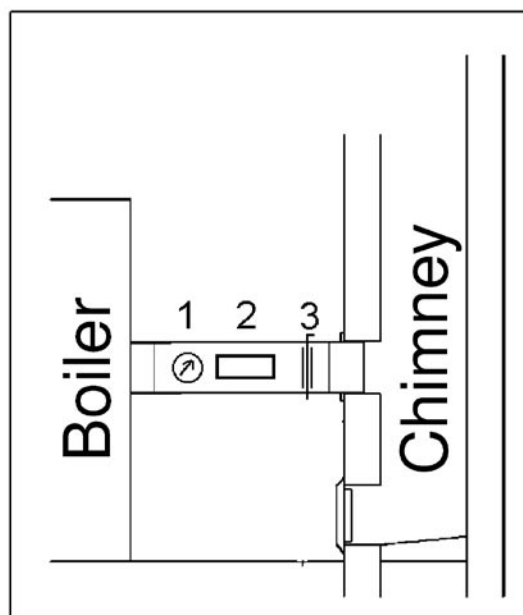
Exact chimney dimensions are stipulated in Czech standard ČSN 73 4201:2002.

Specified chimney draught is stated in section 3 „Technical data“.

## 10. Flue-gas duct

The flue-gas duct must be connected into the chimney vent stack. If the boiler cannot be connected to the chimney directly, the appropriate flue-gas duct extension must be as short as possible in the given circumstances, but not longer than 1m, it must be without additional heating surface and must incline up-

wards in the direction towards the chimney. Flue-gas ducts must be mechanically durable and sealed against combustion products and combustion gas penetration, and it must be possible to clean them inside. The flue-gas ducts must not be lead through another person's apartment or property. The internal diameter of the flue-gas duct must not be larger than the internal diameter of the chimney intake and it must not decrease in width in the direction towards the chimney. Use of elbow-pipes is not suitable. Methods for providing flue-gas duct entries through flammable material structures are stipulated in appendices 2 and 3 of the Czech standard ČSN 061008/97. These are appropriate for mobile installations, wooden cottages etc. The flue-gas duct shall always be fitted with a waste gas thermometer.



- 1 Waste gas thermometer
- 2 Cleaning aperture
- 3 Throttle valve (draught limiter)



In case of excessive chimney draught, install a throttle valve (3) or draught limiter.

## 11. Fire prevention during installation and use of heating appliances

Selected from ČSN 061008/97 – Fire safety of local appliances and heat sources.

### Safe distances

When installing the appliance, keep a minimum safe distance of 200 mm from building materials. This distance is valid for boilers and flue-gas ducts positioned near flammable materials of the B, C1 and C2 flammability class (the flammability classes are listed in chart 1). It is necessary to double the 200 mm safe distance if the boilers and flue-gas ducts are placed near flammable materials of C3 class (see chart 1). It is also necessary to double the safe distance if the flammability class of the material in question cannot be determined. The safe distance can be decreased to one half (to 100 mm) if a heat insulating, non-combustible screen (asbestos board) of a 5-mm minimum thickness, is placed 25 mm from the protected combustible material (so called flammable insulation). The screening board or protection screen (on the protected object) must exceed the boiler outline including its flue-gas duct on each side by at least 150 mm and by at least 300 mm above its upper surface. The screening board or protection screen must be also used for all fixtures and fittings from combustible materials in cases where the safe distance cannot be maintained (such as in mobile structures or wooden cottages etc. - for more details see ČSN 061008 standard). The safe distance must be maintained even when placing fixtures and fittings near the boilers.

If boilers are placed on floors from combustible materials, the floor must be fitted with a non-combustible, heat insulating pad exceeding the boiler's ground-outline on the side where the stoking and ash-pan apertures are, by at least 300 mm (in front of the aperture) and on all the other sides by at least 100 mm. The non-combustible, heat-insulating pad can be made from any material of the „A“ flammability class.

Chart 1

Flammability classes of building materials and products	Building materials and products categorised by their flammability class (selected from Czech standard ČSN 730823)
A – non-combustible	granite, sandstone, concrete, bricks, ceramic tiles, mortars, fireproofing plasters etc.
B – non-easily flammable	Akumin, Izomin, Heraklit, Lignos, basalt felt boards, fibreglass boards, Novodur
C1 – low degree of flammability	deciduous tree wood (oak, beech), Hobrex boards, plywood, Sirkolit, Werzalit, hardened paper (Formica, Ecrona)
C2 – medium degree of flammability	coniferous tree wood (pine tree, larch, spruce), chipboards and cork boards, rubber flooring (Industrial, Super)
C3 – high degree of flammability	fibreboards (Hobra, Sololak, Sololit), cellulose materials, polyurethane, polystyrene, polyethylene, foamed PVC



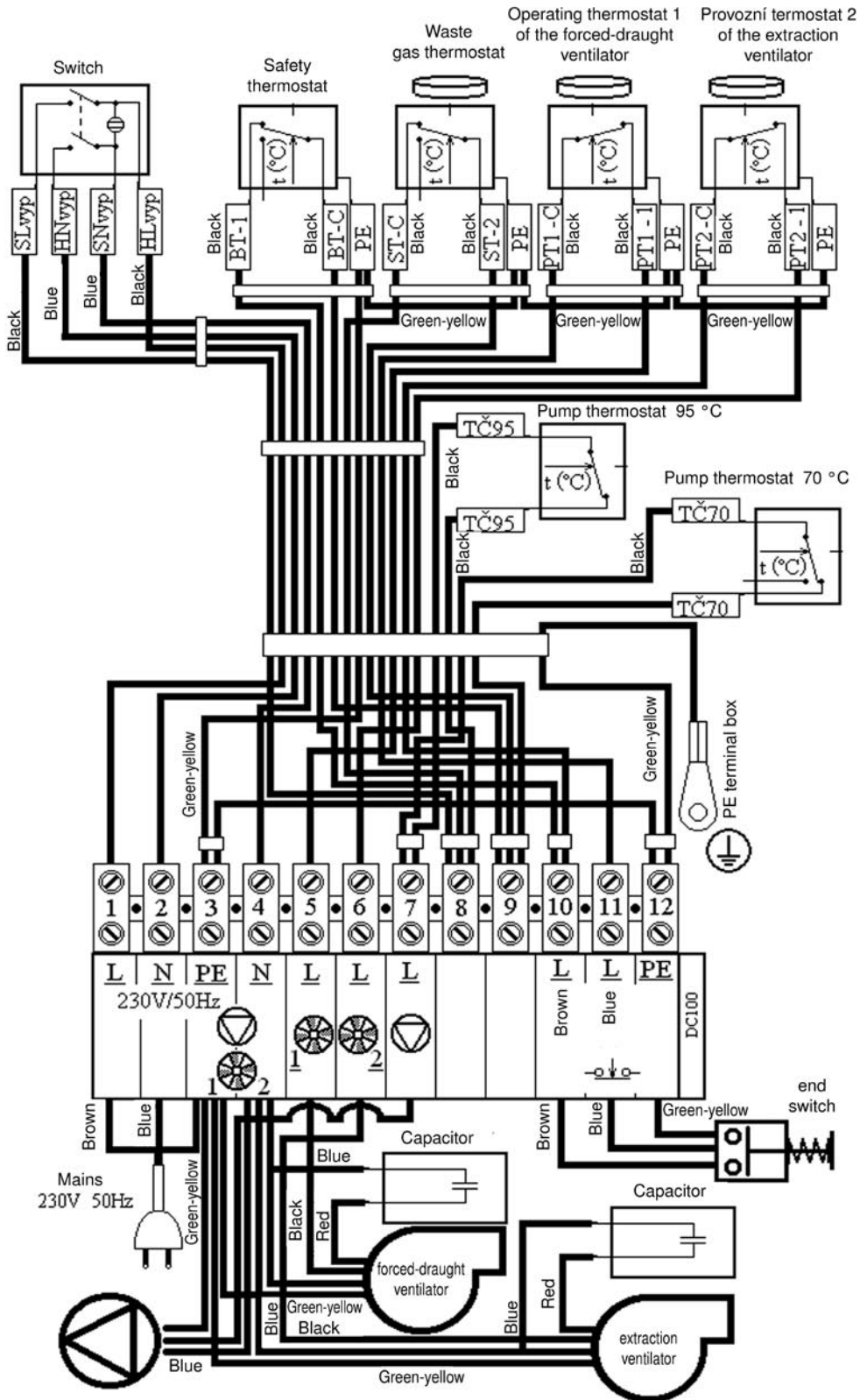
**CAUTION** - In circumstances when there is a risk of temporary access of flammable gases or fumes, or during works when a temporary fire or explosion risk may possibly occur (such as gluing linoleum, PVC etc.) the boilers must be put out of operation long enough before the risk occurrence. **No items from flammable materials may be placed on the boilers or near them in a distance lower than the specified safe distance.**

## 12. Connecting boilers to the electric network

Boilers are to be connected to a 230 V, 50 Hz electric network by means of an electric cord with or without a plug. The network connection is of the M type and when replacement is needed the service company must use the same type connection to replace it. The appliance must be placed in a manner leaving the connecting plug accessible for the operator (in compliance with the Czech standard ČSN EN 60335-1/1997). Connection may only be carried out by a person qualified in compliance with all valid regulations of the particular country.

### 13. Wiring diagram of boiler DC 100 with a waste gas thermostat

GB



## 14. Obligatory ČSN EN standards related to boiler designing and installation

ČSN EN 303-5	- Solid fuel boilers for central heating
ČSN 06 0310	- Central heating, designing and assembly
ČSN 06 0830	- Safety devices for central heating and hot potable water heating
ČSN EN 73 4201	- Designing chimneys and flue-gas ducting
ČSN EN 1443	- Chimney structures – General requirements
ČSN 06 1008	- Fire safety of local appliances and heat sources
ČSN 73 0823	- Construction materials flammability class
ČSN EN 1264-1	- Floor heating – Systems and components – Definitions and symbols
ČSN EN 1264-2	- Floor heating – Systems and components – Heat output calculation
ČSN EN 1264-3	- Floor heating – Systems and components – Designing
ČSN EN 442-2	- Heaters – Testing and test analysis



**CAUTION – the boiler must be installed in compliance with a design prepared in advance. Installation may only be carried out by persons trained by the manufacturer.**

## 15. Choice and connection method of control and heating elements

Boilers are provided to the user with the basic boiler performance control elements compliant with requirements for convenient heating and its safety. The regulation ensures that the required temperature of the water exiting the boiler (80 - 90°C) is adhered to. The boiler is equipped with two thermostats (70°C and 95°C) for switching the boiler-circuit pump. The 70°C thermostat switches the boiler-circuit pump on as soon as the temperature exceeds this value. The 95°C thermostat is a safety component. It protects the boiler against overheating in case of incorrectly set waste-gas thermostat (it switches the boiler-circuit pump on always when the boiler water temperature exceeds 95°C). Connection of these elements is illustrated in the wiring diagram. General rule is that every pump in the system must always be controlled by a separate thermostat to avoid a temperature drop of water returning to the boiler under 65°C. After the boiler has been installed, the pump situated in the heated-building circuit must be switched by means of a separate thermostat or electronic regulation. Setting the required water temperature for the building is always achieved by means of a three-way mixing valve. The mixing valve can be regulated manually or by electronic regulation, which contributes to a more convenient and economical operation of the heating system. The connection of these additional elements is always designed by a specialist designer to suit specific conditions of the heating system. Electric installations related to the additional equipping the boilers with the above mentioned elements must be carried out by an expert in compliance with valid ČSN EN standards.



**When installing the boiler, we recommend using an opened expansion tank. However, a closed tank may also be used if permitted in the standards of the specific country. The boiler must always be installed in a way which prevents overheating (and subsequent damage) even during a power cut. It is because the boiler has certain momentum. There are several ways of protecting the boiler against overheating. Connecting an overheat prevention cooling loop with a TS 130 3/4 A (95°C) or WATTS STS 20 (97°C) valve to the public water system. In cases when the user has his/her own well, the boiler can be additionally protected by using a back-up power supply (battery with an exchanger) for operation back-up of at least one pump. Another option is connecting the boiler to an after-cooling tank and reversal zone valve. When installing the boiler, position the rear section 10 mm higher in order to facilitate**

circulating and air-bleeding.

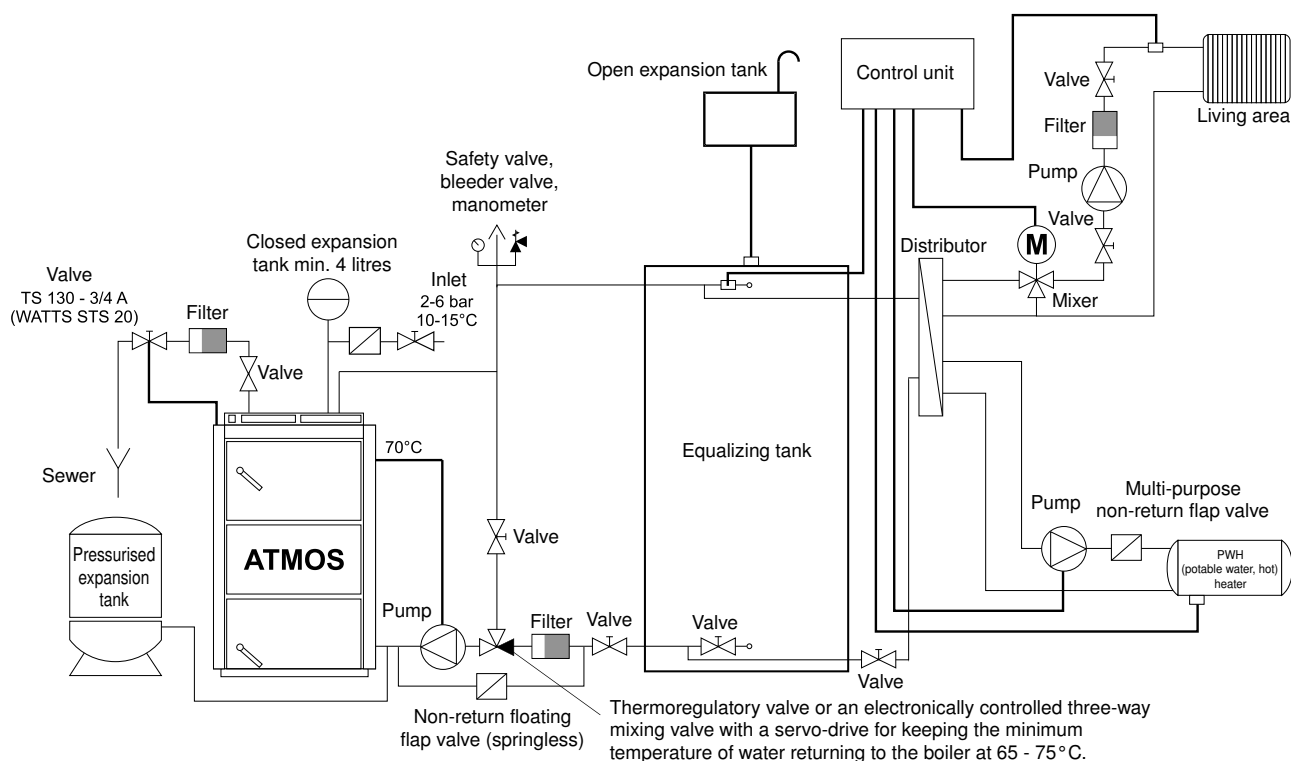
For the heating system regulation we recommend regulation elements provided by the following companies:

- |                       |                        |
|-----------------------|------------------------|
| a) KOMEX THERM, Praha | tel.: +420 235 313 284 |
| b) KTR, Uherský Brod  | tel.: +420 572 633 985 |
| c) Landis & Staefa    | tel.: +420 261 342 382 |

## 16. Boiler corrosion protection

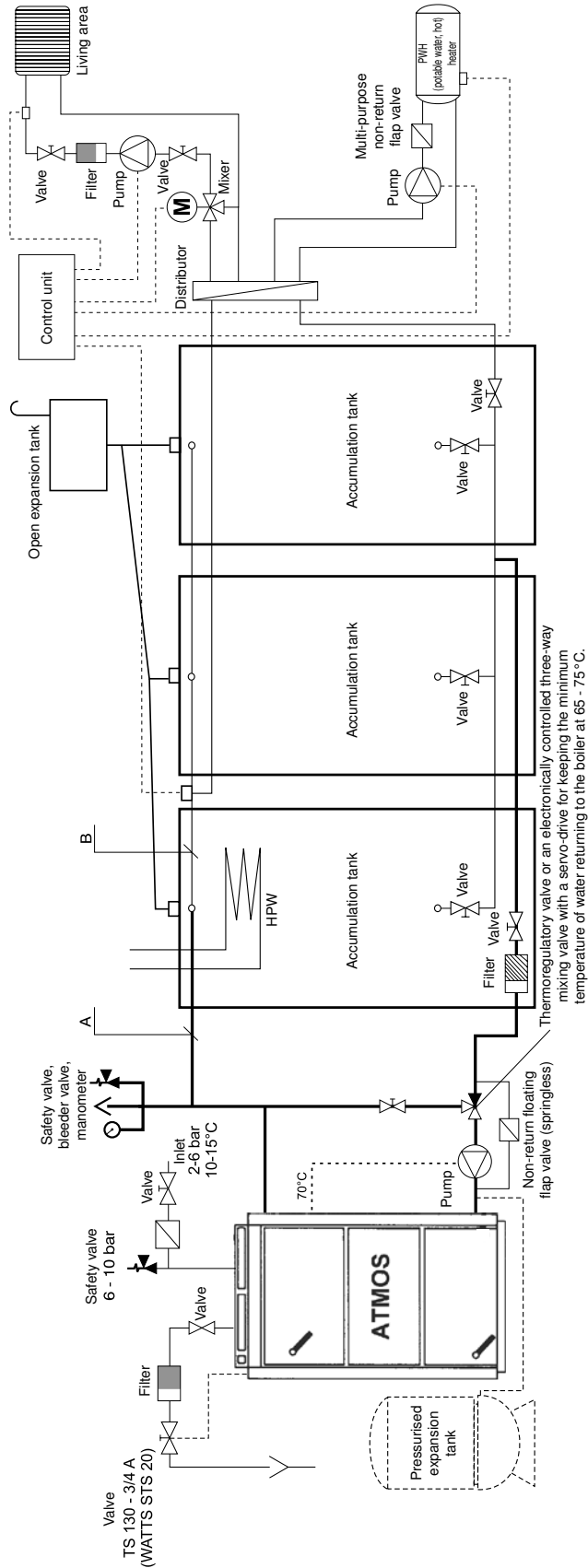
The specified solution is connecting the boiler with a thermoregulatory valve or a three-way mixing valve operated by a servo-drive, controlled by electronic regulation, which can separate the boiler circuit from the heating circuit (primary and secondary circuits), and provide minimum temperature of 65°C - 75°C for water returning to boiler. The higher the temperature of water returning to the boiler, the fewer tars and acids condensing. The tars and acids damage the boiler. Temperature of the outgoing water must permanently range between 80 - 90°C. The combustion products (waste gas) temperature must not drop below 110°C during normal operation. Low waste-gas temperature causes condensation of tars and acids even when the specified outgoing water temperature of 80 - 90°C and returning water temperature of 65°C are adhered to. These conditions may occur when using the boiler to heat hot potable water (HPW) in summer, or when heating only a section of the building. In this case we recommend connecting the boiler with accumulation tanks, or daily firing-up.

## 17. Specified boiler connection with an equalizing tank





# 18. Recommended wiring diagram with accumulators



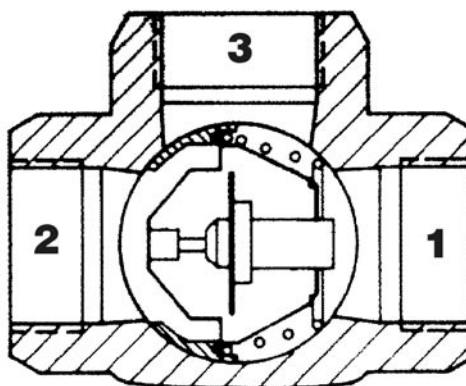
Boiler type and output	section A		section A	
	in copper	in copper	in copper	in copper
<b>DC100</b>	54x2	50 (2")	42x1,5	40 (6/4")

In case that a cooling loop preventing overheating is connected, it is possible to omit the floating non-return flap valve on bypass of the pump, thermal valve or of the three-way mixing valve.

## 19. Thermoregulatory valve ESBE

GB

Thermoregulatory valve type ESBE, TV 60 °C is used with solid fuel boilers. When the boiler water temperature reaches + 60 °C , the thermoregulatory valve opens and fluid from the building heating circuit (2) enters the boiler circuit ( 3 →1). Inlets 1 and 3 always remain open. This ensures that the minimum temperature of the water returning to the boiler is maintained.



The recommended size of the TV 60°C thermoregulatory valve for DC100 boiler is TV 40

## 20. Operating a system with accumulation tanks

Ignite the boiler and allow the accumulation tanks to “charge” to the required water temperature of 90-100°C by the boiler’s maximum output operation (2 to 4 loads). Then leave the boiler to stop burning. Afterwards keep withdrawing heat from the storage utilising the three-way valve for a period of time corresponding to the size of accumulation tanks and the external temperature. In the heating season (and if adhered to specified min. accumulation tanks volumes – see chart) this could take 1 – 3 days. If the accumulation method (5000 - 6000 litres) cannot be used, then the boiler must be connected with at least one tank of 1000-litre volume for equalising the boiler start-ups and run-outs.

### The standard ATMOS accumulation tanks provided

TANK TYPE	VOLUME (l)	DIAMETER (mm)	HEIGHT (mm)
AN 500	500	600	1901
AN 750	750	750	1925
AN 1000	1000	850	2011

### Tanks insulation

A suitable solution is joint mineral wool insulation of the particular number of tanks (of required volume) placed together into a plasterboard structure, or additional filling with granular insulation. When using the mineral wool, the specified minimum insulation thickness is 120 mm. Another option is purchasing tanks in a leather-cloth housing insulated by mineral wool (see the price list).

## Advantages

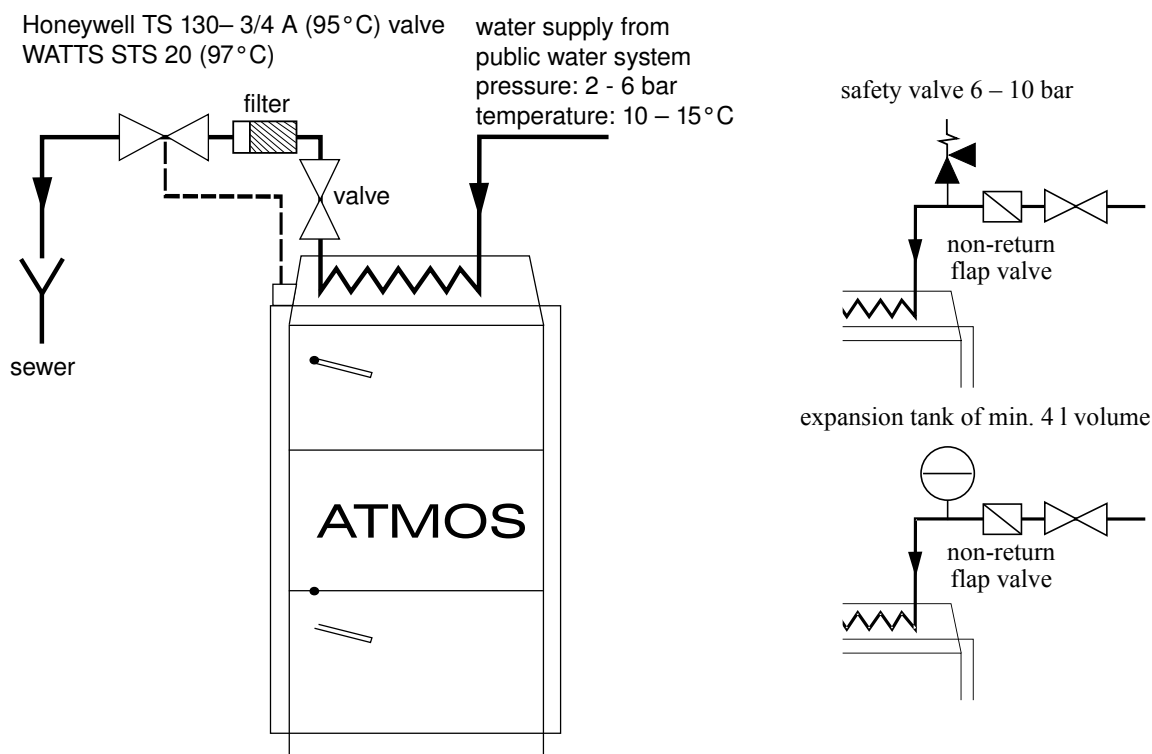
Installing the boiler with accumulation tanks provides several advantages:

- lower fuel consumption (by 20 – 30%), the boiler operates in full output and at optimal effectiveness of 81 - 89 % until the complete combustion of the fuel
- prolonged boiler and chimney service life – minimum formation of wood-tars and acids
- possibility to combine it with other heating methods – accumulated electric power, solar collectors
- combination of wall radiators and floor heating
- convenient heating and ideal fuel combustion

## 21. Connection of overheat protecting cooling loop with a safety valve Honeywell TS 130 - 3/4 A or WATTS STS20 (valve opening temperature 95 - 97°C)



**CAUTION** – in compliance with the EN ČSN 303-5, the cooling loop must not be used for any other purpose than overheat protection (never for heating hot potable water).



The TS 130 - 3/4 A valve or WATTS STS 20 valve, the sensor of which is placed in the rear of the boiler, prevents overheating in the following way: if the boiler water temperature rises above 95 °C, the valve opens and allows water from public water supply system to enter the cooling loop. This water then absorbs the excessive energy and exits to the sewer. In case that a non-return flap valve has been installed to the cooling loop water inlet for the purpose of preventing reversed water flow (which might be caused by pressure drop in the public water supply system), the cooling loop must be fitted with a 6 – 10 bars safety valve or with an expansion vessel of minimum 4 l volume.

## 22. Operating instructions

### Preparing boilers for operation

Before putting boilers into operation, it is necessary to ensure that the system has been filled with water, and air-bled. Wood boilers must be operated in compliance with the instructions stipulated in this manual so that satisfactory and safe functioning is achieved. They should only be operated by adult persons who have suitable qualifications and permissions in compliance with effective regulations of the particular country.

### Ignition and operation

Before fuel ignition, open the ignition valve /13/ by pulling the ignition valve pulling rod /17/ and reduce the waste gas thermostat to the “ignition” value (to minimum - 0°C). Through the top door /2/ insert dry wood kindling on the heatproof shaped piece /5/. Place the kindling perpendicularly to the channel recess in the shaped piece so that a 2 – 4 cm gap between the recess and fuel is created; which allows the waste gas passage. Place paper or wood wool on top of the kindling, then another layer of kindling and larger amount of dry wood. After ignition close the top door and open the lower door. When the fuel has caught sufficient fire, close the lower door, fill the storage tank completely with fuel and close the ignition valve with its pulling rod /17/. Set the waste gas thermostat into the operating position which it is necessary to determine for ideal operation. The waste gas thermostat then switches off both the ventilators when the fuel has burnt out. If the boiler should work as a gasification appliance, then a layer of glowing charcoal must be kept (known as reduction zone) above the gasifying nozzle. This can be achieved by burning suitably sized dry firewood. When burning moist wood, the burner does not operate as a gasification appliance, the fuel consumption increases dramatically, the boiler does not reach the required output and the service life of both - the boiler and the chimney - decreases.



**NOTE** – when igniting for the first time, condensation and condensed fluid leakage occurs – this is not a defect. Condensation will disappear later. When burning small wood waste particles, it is necessary to monitor the waste gas temperature which must not exceed 320°C. Otherwise, the boiler may sustain damage. Wood-tar and condensate formation in the hopper is a side effect of wood gasification.

### Output regulation

The output regulated by means of flap valves placed on the ventilators – by setting required temperature of outgoing water on the relevant thermostats (1, 2). Each control thermostat controls independently one ventilator. We recommend to keep a 5 – 10°C step between the thermostat settings (85/90°C). Each ventilator opens the control flap valve on the output by means of air pressure. The flap valve opening is limited by stoppers (do not change the stopper settings – see below). When operating the boiler in an lower output mode, it is possible to use just one ventilator. Operating temperature of water in the boiler must be in the 80 - 90°C range.

## 23. Setting the boiler output and combustion

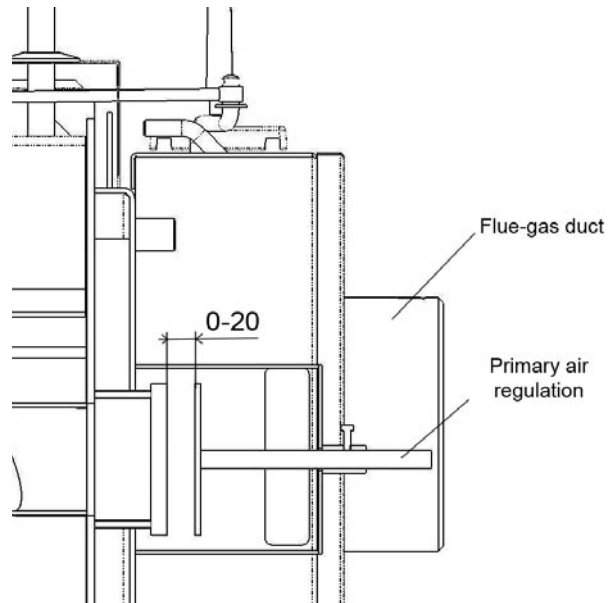
### Basic setting of primary-secondary air ratio

**Optimum setting:**

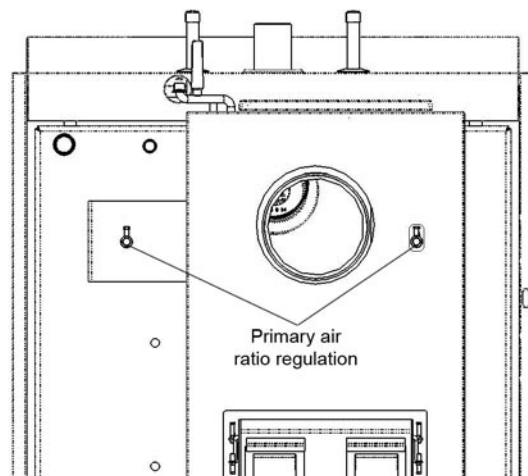
To the stopper (12 mm) + 0 ÷ 5 mm

**Maximum setting:**

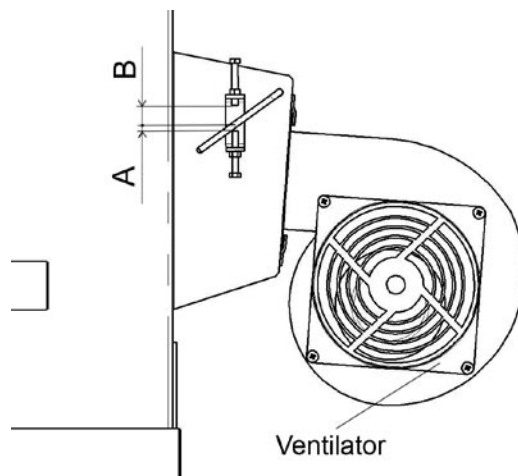
To the stopper (12 mm) + 5 ÷ 20 mm



**i** Adjustments to settings should be done on the basis of the waste gas analyser and maximum temperature which must not exceed 320°C at the outlet to chimney, at stabilised nominal output /with closed ignition valve/. The boiler is factory-set to optimal parameters. Therefore, carry out any changes just in case of inadequate operational conditions.



- A - minimum flap opening – setting of limited air suction-supply with ventilator switched off – slow burning mode A = 4 – 7 mm
- possibility to set boiler lower output when operating without the ventilator – alternative operation
- A set to max.
- B - maximum flap opening – setting the boiler nominal output B = 4 - 10 mm



## 24. Fuel Refill

Before fuelling, open the ignition valve /13/ with the pulling rod /17/ and switch the ventilators off. Wait for approximately 10 seconds and slowly open the loading door /2/ so that any accumulated gases are first vented off into the flue-gas duct instead of escaping into the boiler room. Place a broad log over glowing charcoals. Be careful not to pack the fuel down too much above the gasification nozzle. This may extinguish the flame. When loading fuel fill the hopper up completely. In order to prevent excessive smoke formation, load new batch of fuel only after the previous fuel has combusted to at least one third of the loading volume.

## 25. Slow-burning mode

It is possible to use boilers for slow-burning operation, i.e. keeping the fire up overnight without the necessity to fire-up every day. This is only permitted **during wintertime**. This operating method however decreases the boiler service life. Prepare the boiler for slow-burning operation in the following way:

- place several larger logs on a glowing layer of partially combusted fuel
- reduce the mixing valves

After the valves have been reduced, the boiler water temperature increases to 80 - 90°C and the control thermostats switch off

- the boiler will operate in an lower output mode

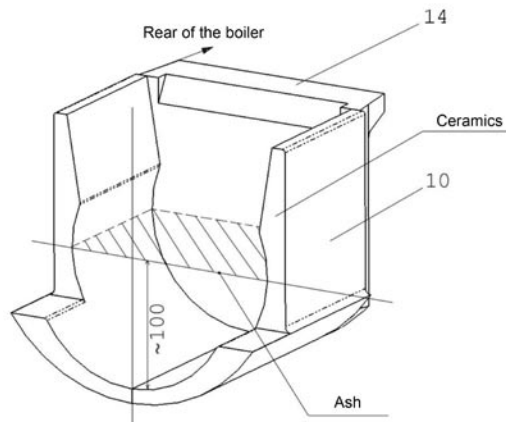
In boilers prepared as previous, the fuel burns for 8 – 12 hours. The actual slow-burn combustion time depends on the amount of fuel placed in the boiler and on the actual quantity of consumed heat. **Even if the boiler operates in the slow-burn mode, it has to keep the output water temperature ranging between 80 - 90°C and returning water minimum temperature 65°C.**

## 26. Boiler cleaning

It is necessary to clean the boilers regularly and thoroughly every 3 to 5 days because the flue cinder accumulated in the fuel storage tank together with tars and acids insulate the heat-transfer surface and dramatically decrease the boiler's service life and performance. If excessive amount of cinder is left to form in the lower chamber, then the burn-off area is insufficient and damage to the fireclay nozzle holder or the whole boiler may occur. Carry out the cleaning procedure by first switching the ventilators off. Then open the loading door /2/ and sweep the cinder down through the slot into the lower chamber. Leave long pieces of wood which have not fully combusted (charcoals) in the hopper for the next time the boiler is used. Open the cleaning lid /15/ and clean the rear flue gas duct with a brush. In case that there is a decelerator placed in the ducting (corrugated sheet metal) it is necessary to remove it before the cleaning procedure. Remove all soot and cinder after opening the lower lids /15/. Open the lower door /3/ and clean the fireclay chamber from cinder and soot. Use also a poker or a brush to remove dust sediments from the lower combustion chamber walls. Remove also the two side lids placed on both sides of the combustion chamber lower door and thoroughly clean the tube heat exchanger.

The actual cleaning interval depends on the fuel quality (wood moisture), intensity of heating, chimney draught and other circumstances and needs to be determined by the user. We recommend cleaning the boilers once a week. Do not pull out the fireclay shaped piece /10/, /14/ when cleaning. At least once a year check and if necessary clean both the ventilators.

## Fire-clay cinder area



**Maximum ash quantity – up to half of the spherical space (to maintain good boiler functionality).**



**NOTE** –regular and thorough cleaning is important for permanent effectiveness and a long service life of your boiler. If not cleaned properly, damage to the boiler may occur – the manufacturer’s guarantee is rendered invalid.

## 27. Heating system maintenance - including boilers

Inspect at least once every 2 weeks. If necessary, refill the system with water. If the boilers are out of operation during wintertime, a risk of water freezing in the system arises. Therefore, we recommend letting the water out from the system or filling it with antifreeze mixture. In other situations, only let water out if absolutely necessary and keep without water for as little time as possible. When the heating season is over, clean the boiler thoroughly and replace damaged parts. **Do not leave parts replacement for the last moment; prepare your boiler for the heating season as early as in spring.**

## 28. Use and inspections

The operator must always act in compliance with the usage and maintenance instruction manual. Any adjustments to the boilers which may lead to operator’s or other persons’ health risk are prohibited. The boiler may be operated by a person older than 18 years who is familiar with the instruction manual and with the appliance operation, and who is in compliance with the Section 14 of the 24/1984 Coll. government decree. It is prohibited to leave unattended children in the vicinity of operating boilers. When operating solid-fuel boilers it is prohibited to use flammable liquids for ignition. It is also prohibited to increase the boiler nominal output during operation (known as overheating) by any means. It is prohibited to place any flammable items on the boilers or near their loading and ash-pan apertures. Removed ash must be placed into vessels from non-combustible materials fitted with a lid. The operator must occasionally inspect operating boilers. The user may only carry out repairs consisting of replacement of delivered spare part (such as fireclay shaped piece or sealing cord etc.). When in operation, always check that the boiler doors and cleaning apertures are well sealed – always tighten them well. The user must not tamper with the boiler construction or its electrical installation. The boiler must be cleaned well and on time, ensuring that all ducts are always obstacle-free. Loading door and ash-pan door must always be well closed.

## 29. Possible failures and troubleshooting

GB

Failure	Reason	Solution
<b>The “mains” indicator not lit up</b>	<ul style="list-style-type: none"> <li>- no voltage in network</li> <li>- plug incorrectly inserted to el. socket</li> <li>- defective power supply switch</li> <li>- defective electric cord</li> </ul>	<ul style="list-style-type: none"> <li>- check</li> <li>- check</li> <li>- replace</li> <li>- replace</li> </ul>
<b>Boilers do not reach their required outputs and the pre-set water temperature</b>	<ul style="list-style-type: none"> <li>- not enough water in the system</li> <li>- excessive pump output</li> <li>- the boiler output is not sufficiently rated for the particular heating system</li> <li>- low quality fuel (high level of moisture, large pieces)</li> <li>- ignition valve leaking</li> <li>- insufficient chimney draught</li> <li>- excessive chimney draught</li> <li>- <b>insufficiently cleaned boiler</b></li> <li>- combustion-air inlet to loading chamber is clogged</li> </ul>	<ul style="list-style-type: none"> <li>- refill</li> <li>- adjust the pump’s switching and flow rate</li> <li>- design issue</li> <li>- burn good quality coal and dry wood; split logs in half</li> <li>- repair</li> <li>- new chimney; unsuitable connection</li> <li>- pull the draught regulator pulling rod out</li> <li>- place a throttle valve (draught limiter) in the flue-gas duct</li> <li>- <b>clean</b></li> <li>- clean</li> </ul>
<b>Door leaking</b>	<ul style="list-style-type: none"> <li>- defective fibreglass cord</li> <li>- the nozzle becomes clogged</li> <li>- insufficient chimney</li> </ul>	<ul style="list-style-type: none"> <li>- replace</li> <li>- adjust the door hinges</li> <li>- do not burn small-particle wood, sawdust, bark</li> <li>- chimney defect</li> </ul>
<b>Ventilator does not turn</b>	<ul style="list-style-type: none"> <li>- boiler overheated</li> <li>- safety thermostat fuse interrupted</li> <li>- rotating wheel clogged</li> <li>- defective capacitor</li> <li>- defective motor</li> </ul>	<ul style="list-style-type: none"> <li>- press the thermostat push-button (using a pen)</li> <li>- clean the ventilator including the ducting from tar and sediments</li> <li>- replace</li> <li>- replace</li> <li>- check - measure</li> </ul>
<b>The ventilator’s control flap gets stuck because it is covered in tar</b>	<ul style="list-style-type: none"> <li>- the flap closes down completely</li> </ul>	<ul style="list-style-type: none"> <li>- increase the suction-intake of air ( flap pos. A) by 3 – 5 mm</li> </ul>



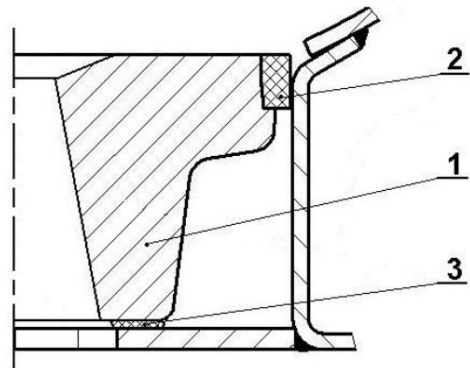
## 30. Spares

Heatproof shaped piece - nozzle	/5/
Heatproof shaped piece	/10/,/12/, /14/
Ventilator	/4/
Switch with an indicator light	/20/
Thermometer	/18/
Control thermostat	/19/, /24/
Safety thermostat	/36/
Waste gas thermostat	/35/
Door sealing cord 18 x 18	/26/
Door filling – Sibral – large (upper)	/25/
Door filling – Sibral – small (lower)	/32/
Capacitor for the forced-draft ventilator - 3 $\mu$ F	/33/
Safety thermostat for pump 95°C	/30/
Safety thermostat for pump 70°C	/29/

### Heatproof shaped piece (nozzle) replacement

- Material list
1. heatproof shaped piece
  2. sealing cord (3 pcs)
  3. boiler sealant (white)

Procedure: Remove or break up the old heatproof shaped piece (further referred to as „nozzle“). Thoroughly clean the nozzle holder, which the nozzle was seated on, from tar and old sealant. Roll slim strands of boiler sealant. Place these continuously round the nozzle holder aperture in such a way which would prevent any penetration



of secondary air underneath the nozzle later on. Take the first new nozzle in your hand, stand in front of the boiler and position the nozzle in such a way that its recess (cut-out) is positioned in a direction away from you and downwards (the recess is positioned inside the boiler; a mark on the nozzle - if present – is positioned backwards). The secondary air is brought to the nozzle from the rear section of the boiler. Place the nozzle on its holder and fully push towards the rear of boiler. Position it in such a way that free play between nozzle and holder is the same on both - the left and right side. Take the second nozzle and place it in front of the first one. Take the sealing cords and place them along its sides and front, between the boiler drum and the second front nozzle. By gently tapping calk them evenly round its circumference so that they are level with the nozzle. Cover the sealing cord connections and connections of both the nozzles with a small amount of boiler sealant.

### Door sealing cord replacement

Procedure: Use a screwdriver to remove the old sealing cord and to clean the groove in which it was seated. Lightly shape the cord from a square into a trapeze cross-section using a hammer. Manually

press the sealing cord along the door circumference (place the narrower base into the groove first) in such a way to ensure that the cord sticks well in the groove (if necessary, use a hammer). Position the lock's handle upwards, and with several gentle, careful taps of the door against the boiler, press the cord into the groove until the door can be closed. Fine-tune the position of the wheel that engages the lock's cam. This is the only procedure that can ensure good door seal!

## Adjusting the door hinges and locks

The loading door and ash-pan door are firmly connected to the boiler drum by two sets of hinges. Each hinge consists of a nut, which is welded to the boiler drum, and a setting-screw to which the door is connected by means of a pin. If you want to adjust the hinge settings, first take off the upper hood (control panel) and remove both pins. Then remove the door and slightly turn the screw with a right-hand thread, as necessary. By following these steps in reverse order, you can replace the door.

The door lock consists of a lever with a handle and a cam which engages a wheel that is screwed into the boiler and secured by a nut preventing its turning. After a certain time, the sealing cord gets pressed down and therefore it becomes necessary to screw the wheel further into the boiler. First, loosen the wheel's nut and screw the wheel into the boiler in such a way that after firmly closing the door, the lock's handle is in the „20 minutes past the hour“ position. Then tighten the nut.

## 31. Environmental protection

The ATMOS gasifying boilers comply with the most demanding environmental requirements and were awarded the “Environmentally friendly product” mark, in compliance with directive No. 13/2002 of the Ministry of Environment of the Czech Republic. The boilers are certified in compliance with the European standard EN 303-5 and they fall within class 3.

### Disposal of the boiler after expiration of its service life

It is necessary to provide an ENVIRONMENTALLY FRIENDLY disposal of the boiler's individual parts.

Before disposal, clean all the flue cinder and place it in a refuse bin.

Take the boiler drum and hood to a scrap-metal collection site. Take all the ceramic (fireclay) parts and insulation to an approved refuse site.

**CAUTION** - In order to comply with the environmentally friendly operation requirements, it is prohibited to burn any other substances than specified for the boiler. Plastic bags, various plastic materials, paints, textiles, laminate are substances which shall be particularly avoided but also avoid burning sawdust, sediment and coal dust.



## GUARANTEE CONDITIONS

### Hot-water boiler

1. If adhered to the product's use, operation and maintenance as described in the instruction manual, we guarantee that the product will maintain the characteristics as stipulated by the corresponding technical standards and terms for the duration of a guarantee period – of 24 months after the product's acquisition by the user; maximum 32 months after the manufacturer has sold it. If the boiler is installed with a TV 60°C thermoregulatory valve or with an electronically controlled three-way valve for keeping the min. temperature of water returning to boiler at 65-75°C in all boiler operation modes and in combination with an accumulation tank (see the schematics), the guarantee period for the boiler drum is extended from 24 to 36 months. The guarantee period for other parts remains unaffected.
2. If a defect not caused by the user appears on the product during the guarantee period, the defect will be repaired free of charge.
3. The guarantee period is extended by the period of time for which the product was under repair.
4. A claim to provide a guarantee period repair shall be made by the customer at the service company.
5. The guarantee claim is justified only in cases where the boiler installation was carried out by a person trained by the manufacturer and in compliance with valid standards and the instruction manual. A necessary condition for justifying a guarantee claim is possession of a legible and complete record identifying the company who installed the boiler. If the installation was not carried out in a professional manner, the subsequent costs are borne by the company that carried out the installation.
6. The purchaser was familiarised with the use and operation of the product – in a provable way.
7. A claim to provide an after-guarantee period repair shall be made by the customer at the service company, too. In this case, the customer bears the repair costs.
8. The user is obliged to adhere to instructions from the operation and maintenance manual. If the operation and maintenance manual is not adhered to, in cases of negligent or unprofessional handling, or burning prohibited substances, the guarantee expires and the repair costs are borne by the customer.
9. Boiler installation and operation must be in compliance with the instruction manual where the outgoing water temperature is in the 80 - 90° range and the temperature of water returning to boiler at least 65°C in all its operation modes.
10. There is an obligation to have the boiler inspection carried out including its controls settings, structural elements and extraction (gas exhaust) system by an expert company at least once a year – confirmed in a warranty card.

For boiler types designated for the Czech Republic, Poland, Russia, Romania, Lithuania, Latvia and Hungary no guarantee conditions or insurance policies from outside these countries apply.



**Guarantee and post-guarantee period repairs are carried out by: company representing ATMOS in the particular country for the particular region installation company that carried out the installation**

**- Jaroslav Cankař a syn, ATMOS, Velenského 487, 294 21 Bělá pod Bezdězem, Czech Republic, Tel. +420 326 701 404**

# BOILER INSTALLATION REPORT

GB

## Installation carried out by:

Company: ..... □

Street: .....

Town: .....

Telephone: .....

Country: .....

## Ascertained data:

### Chimney:

### Flue-gas duct:

Dimensions: .....

Diameter: .....

Height: .....

Length: .....

Chimney draught: .....\* Number of elbow pieces: .....

Date of last inspection: ..... Waste gas temperature: .....\*

## Boiler connected with mixing valves and fittings (brief description of connection):

..... □

..... □

..... □

..... □

## Fuel:

Type: .....

At the start up stage, the functional check of

Size: .....

the boiler and all its control and safety

Moisture content: .....\*

elements was carried out.

Person responsible for the inspection: ..... Date: .....

Stamp : .....

Customer's signature: .....

*(Responsible person's signature)*

\* measured values

## Annual inspection records

GB

Date	Date	Date	Date
Stamp and signature	Stamp and signature	Stamp and signature	Stamp and signature
Date	Date	Date	Date
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Date	Date	Date	Date
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Date	Date	Date	Date
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Date	Date	Date	Date
Stamp and signature	Stamp and signature	Stamp and signature	Stamp and signature

# Records about guarantee period and after-guarantee period repairs

GB

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## Declaration of Conformity No. 007-02-02/DC

in compliance with Section 13, Subsection 2 of the Act No. 22/1997 Coll. , as amended; Section 5 of the Government Decree No. 168/1997 Coll., as amended; Section 13 of the Government Decree No. 163/2002 Coll.

issued by the company

**The Manufacturer:** Jaroslav Cankař a syn ATMOS  
Velenského 487 294 21 Bělá pod Bezdězem  
ID No: 11303344 hereby declares under  
sole responsibility that

**The product:** wood burning hot-water boilers  
**Type:** DC18S, DC22S, DC25S, DC32S, DC50S, DC70S,  
DC20GS, DC25GS, DC32GS, DC40GS, DC30SE, DC40SE,  
DC50SE, DC75SE, DC15E, DC100

**Product application:** Wood burning, hot-water, gasification boiler model range with nominal output 15 to 100 kW designated for heating in residential houses and other similar buildings.

Is in conformity with basic requirements stipulated in the Government Decree No. 168/1997 Coll., as amended; and No. 163/2002 Coll.

**List of Technical Regulations:** ČSN EN 303-5:2000  
ČSN 06 1008:1997  
ČSN EN 60335-1:1997  
Government Decree No. 502/2000 Coll.

The product is under the above-stipulated conditions of application safe.

The manufacturer, Jaroslav Cankař a syn, ATMOS, adopted controlled-documentation measures, which assure conformity of all products launched on the market with technical documentation and basic production requirements.

**Conformity Assessment:** was carried out in compliance with Section 10 of the Act No. 22/1997 Coll., with the Government Decree No.163/2002 Coll. and the Government Decrees No. 17/2003, No. 18/2003 and No. 26/2003.  
The Certificate No. B-30-00473-06 was used for the conformity assessment. The certificate was issued on 13/7/2006 (and is valid till 31/7/2008) by an accredited authority No. 202 (Engineering Test Institute – Strojírenský zkušební ústav, s.p., Registered Office: Hudcova 56b, 621 00 BRNO) ID No: 00001490

In Bělá pod Bezdězem, on 13 July 2006

Jaroslav Cankař  
*Firm owner*

