KWB
Biomass Heating Systems

Log-wood heating
KWB Classicfire 20 – 50 kW
Technology and planning

www.kwb.at

KWB Classicfire
Log-wood heating system 20 – 50 kW

We provide energy for life!

An ecological and economical success story

Innovative ideas, intensive research and continuous further development have made KWB one of Europe's leading providers in the area of biomass heating systems.

Heating with biomass

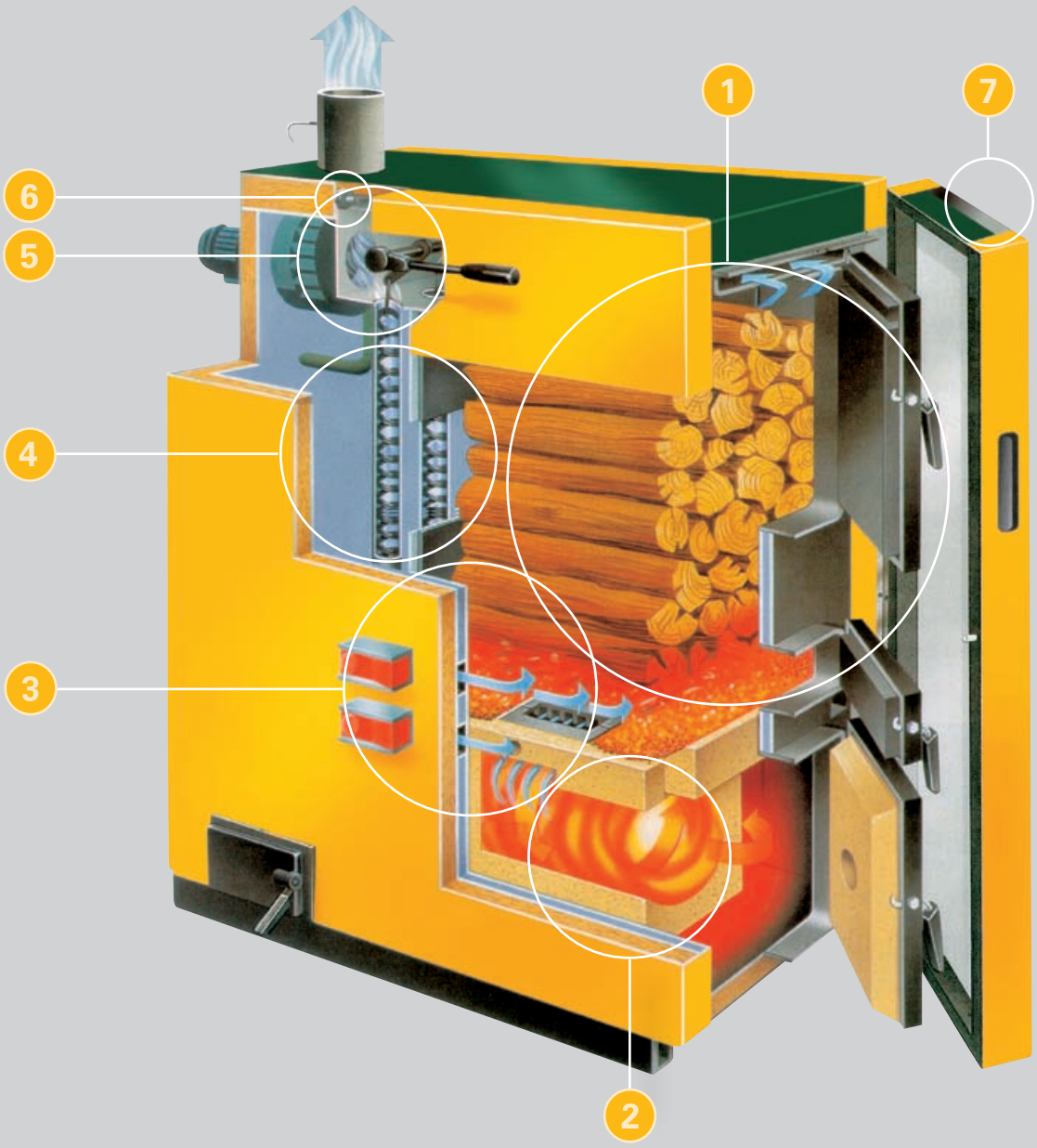
When heating with wood you protect the environment, safeguard local jobs, and you are independent of the global market. As opposed to burning fossil fuels, no additional CO_2 is released when burning wood. Thus the use of wood makes a valuable contribution to the reduction of greenhouse gases and reduces global climate change.

Log-wood

Heating with log-wood is the traditional way of extracting heat from biomass. Combined with modern KWB technology this is an extremely cost-effective heating variant. Log-wood is usually wood used for heating that ranges from 25 cm to 100 cm in length. To achieve optimal combustion the wood is layered for drying and should be stored one (fir) to two (beech) summers.

KWB Classicfire 20–50 kW

Classicfire KWB, with a burning time of up to 20 hours, ideally combines the advantages of traditional wood heating with the comfort of modern heating systems. Thanks to the different power ratings from 20 to 50 kW it is suitable for single-family homes and apartment buildings, as well as for agricultural buildings. Firewood with a maximum length of 55 cm, G100 wood chips as specified in ÖNORM 7133, as well as dry saw mill remnants can be burned. Water content of the fuel should not exceed 25 %.



1. **Fill area:** Large fill door, spacious fill area, long burning time
2. **High-temperature circulation combustion chamber:** Perfect burnout, low emission, efficient fly-ash separation
3. **Air ducting:** Separate adjustable primary and secondary air shutters
4. **Heat exchanger:** Upright tube heat exchanger with special turbulators
5. **Induced draft fan:** Speed-controlled, modulating capacity adjustment
6. **Lambda control system:** Permanent flue gas analysis, stable combustion, low emissions
7. **Operating and control system KWB Comfort 3:** Innovative, easy-to-operate, automatic, and unique

Your advantages

SPACIOUS

Fill area

The generously dimensioned front door ensures a high level of convenience when heating. The spacious fill area with lower burnout is designed for firewood, however it can also be charged with larger wood chips. It has a special apron to protect against corrosion. Thanks the generous dimensions of the combustion chamber an extremely long burning time of up to 20 hours without post-heating is possible. An additional advantage is that log-wood to a length of 55 cm can be used. Heat-up via a separate **heat-up door** arranged under the fill door.

INTELLIGENT DESIGN

Circulation combustion chamber

The high-temperature circulation combustion chamber arranged under the combustion chamber and clad in chamotte guarantees optimal burnout. The combustion air is supplied via separately regulated primary air and secondary air shutters and is suctioned in by a speed-controlled induced-draft fan. The results are low emission values, extremely low accumulation of ash and the most efficient fuel consumption

EFFICIENT

Full insulation

The **insulating concept** of the KWB Classicfire is conspicuous. The all-around full insulation ensures **increased efficiency** by lowering casing losses. The operating doors are further shielded with a special insulating door; the air between these elements is warmed by the radiant heat and is used as preheated combustion air. This feature also contributes to optimisation of the efficiency level.

Removal of carbonisation gas

A special extraction system ensures that occurring carbonisation gases cannot escape when opening the combustion chamber door.

ECONOMICAL

Heat exchanger cleaning system and special turbulators

The **special turbulators** with which the KWB Classicfire is equipped ensure perfect heat transfer and thus increase efficiency. In addition they are part of the **heat exchanger cleaning system** that is operated with a cleaning lever. Regular activation of this lever achieves uniform **higher efficiency**. With efficiency rates up to 94 % optimal fuel utilisation and economical boiler operation are ensured.

PROVEN

Control technology

The **lambda control system** ensures **high-quality combustion** and **minimum emissions** even if fuel qualities and quantities fluctuate, through permanent flue gas analysis via the lambda probe. Moreover, thanks to the modulating power regulation system, ranging from fuel bed maintenance to full load, **optimal fuel utilisation** is achieved, particularly in combination with an appropriately dimensioned buffer tank.

INNOVATIVE

KWB Comfort 3 control unit

The **menu-driven 2-button control unit with dial** and **easy-to-understand graphic display** is a KWB innovation. A logically structured menu system shows users of KWB heating systems how to adjust all personal parameters for heating circuits, buffer tanks and DHWC, etc. An additional highlight is control of the heating system by means of SMS with the **KWB Comfort SMS**.

KWB Comfort

KWB Comfort 3 microprocessor control system

KWB Comfort 3 is a modularly designed system that is used to operate and regulate the KWB biomass heating systems.

All adjustments can be made using the **2-button control unit** together with a **dial** on the innovative, easy-to-understand **graphic display.** Parameters for boiler, heating circuit, DHWC, and buffer tank can be easily configured using the logically structured menu system.

The control unit adjusts boiler output according to heat demand, fully automatically and infinitely variable from standby to full load. The control concept ensures optimum combustion conditions, minimum emissions, and maximum economic efficiency.

In addition to **regulating the burner,** it also provides comprehensive **heat management** – from a single-family home to a district heating network. As a modular, expandable system, the KWB Comfort enables control of up to 34 heating circuits, 17 buffer tanks and 17 DHWCs. It is also possible to link several digital or analogue remote-control devices – of course, all capable of being retrofitted.

Boiler control unit


Analogue remote control unit

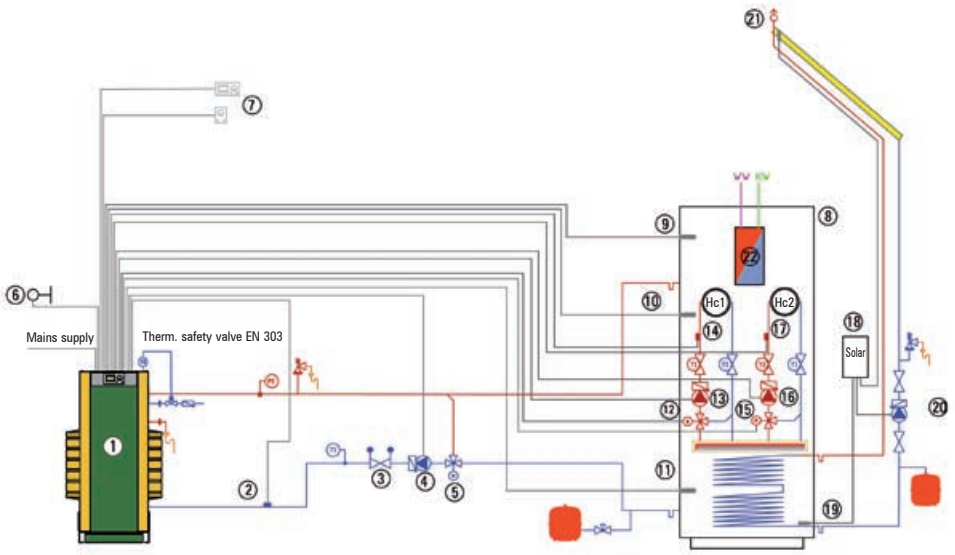
Heating circuit expansion module


KWB Comfort Solar

The control unit consists of the following components:

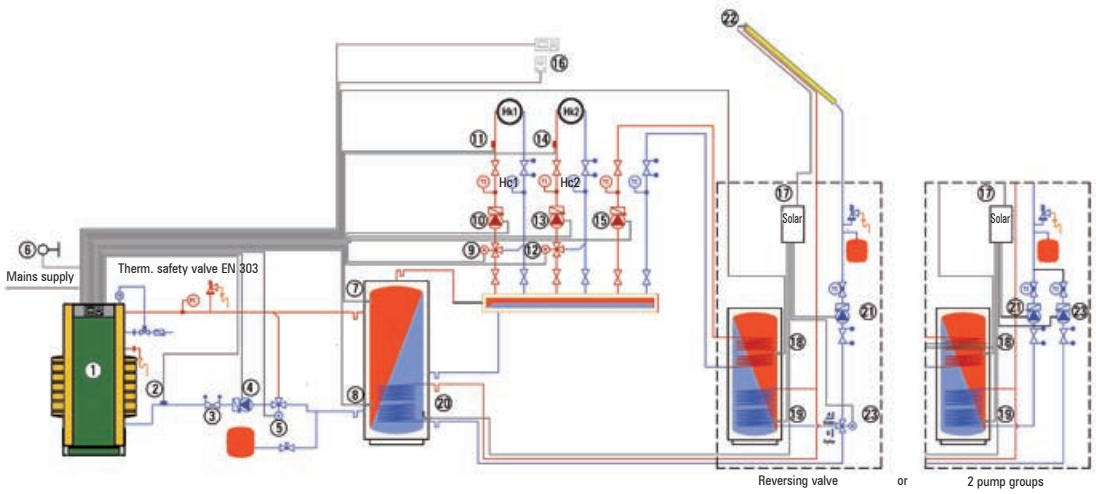
1. **Master board:** Contains all inputs/outputs for boiler control, incl. sensors and terminal strip for external connections. The master board also includes the activation for one DHWC and one buffer tank with two temperature sensors.
2. **Boiler control unit:** Another KWB innovation. This module is used to operate and regulate the boiler and for purposes of heat management. The boiler control unit can additionally be used as a data display, room thermometer and remote-control unit.
3. **Analogue remote control unit:** Simple operation for a heating circuit with room sensor consisting of a dial for adjusting the desired room temperature by ± 5 °C and a 4-position slide switch for selecting the heating program: automatic mode, lower mode, frost protection mode or day operation.
4. **Digital remote control unit:** Enables operation of one or more heating circuits with room sensor as well as configuration and monitoring of heating circuit, DHWC and buffer tank management from the living room.
5. **Heating circuit expansion module:** Controls a max. of 2 heating circuits, one DHWC and one buffer tank (with 2 sensors) per module. Operation and monitoring are carried out using the boiler control unit or optionally by digital remote control devices.
6. **KWB Comfort Solar:** Through the KWB Comfort Solar control system the heating system is controlled in such a manner that free-of-charge solar energy is optimally routed into the storage tank. In addition to functionality and design the solar control system is primarily characterised by the self-explanatory user interface. A convenient commissioning wizard is available for the heating engineer.

Implementation recommendation:
KWB Easyfire with KWB EmpaCompact Solar



1 Boiler
2 Return flow sensor
3 Pipe regulating valve
4 Pump return-flow boost (calculate capacity)
5 Constant-control mixing valve or mixer with servomotor
6 Outdoor sensor
7 Remote control digital/analogue
8 KWB EmpaCompact Solar
9 DHWC sensor
10 Buffer tank sensor 1
11 Buffer tank sensor 2
12 Mixer HC1
13 Pump HC1
14 Forward flow sensor HC1
15 Mixer HC2
16 Pump HC2
17 Forward flow sensor HC2
18 KWB Comfort Solar
19 Buffer tank sensor, solar
20 Collector pump
21 Collector sensor
22 Fresh water module

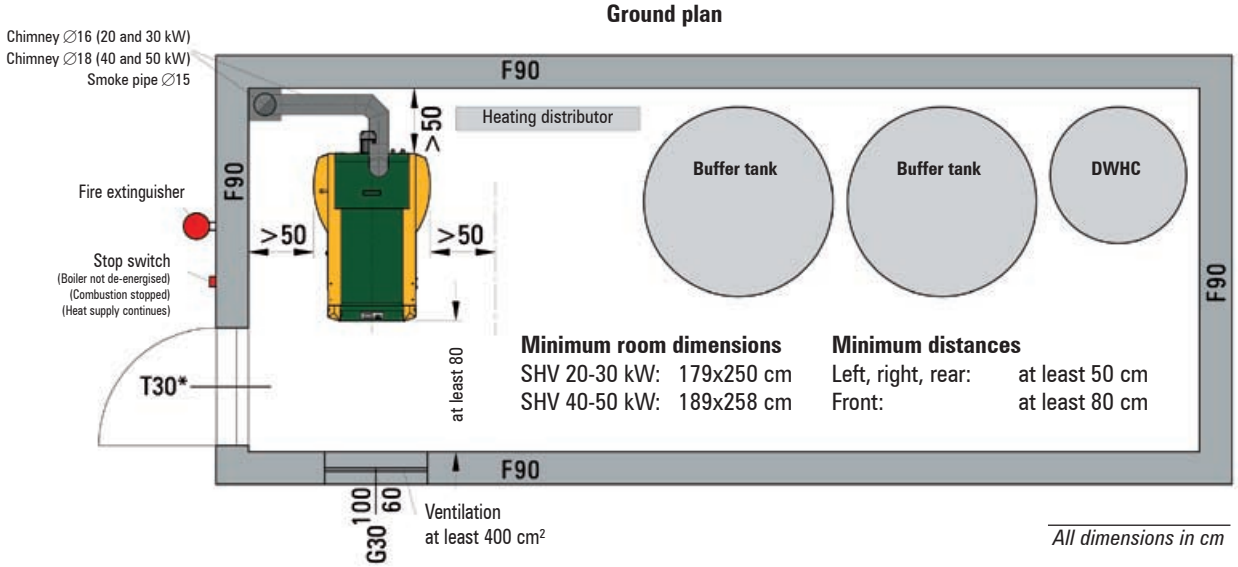
Implementation recommendation:
KWB Classicfire with KWB EmpaEco Solar and KWB EmpaTherm Solar



1 Boiler
2 Return flow sensor
3 Pipe regulating valve
4 Pump return-flow boost (calculate capacity)
5 Constant-control mixing valve or mixer with servomotor or thermal
6 Outdoor sensor
7 Buffer tank sensor 1
8 Buffer tank sensor 2
9 Mixer HC1
10 Pump HC1
11 Forward flow sensor HC1
12 Mixer HC2
13 Pump HC2
14 Forward flow sensor HC2
15 DHWC pump
16 Remote control digital/analogue
17 KWB Comfort Solar
18 DHWC sensor
19 Solar sensor
20 Buffer tank sensor, solar
21 Collector pump
22 Collector sensor
23 Reversing valve or pump

Installation example – dimensions

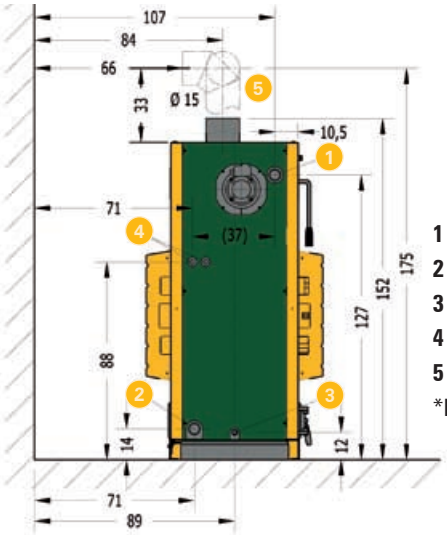
Ground plan



All dimensions in cm

KWB Classicfire 20–30 kW

Height, flue gas connection incl. bend: 175 cm

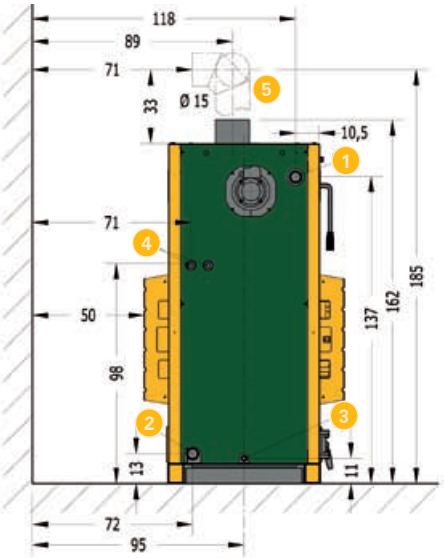


Outline

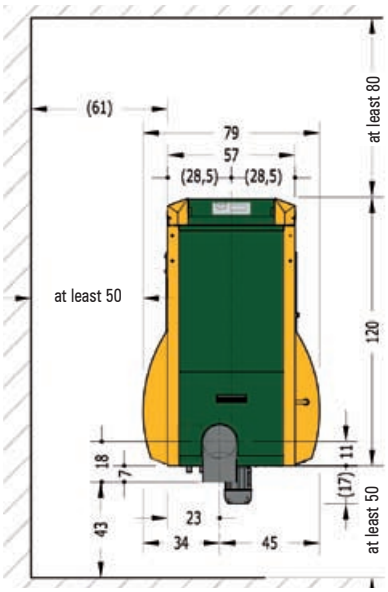
1 Connection, forward flow ¾"
2 Connection, return flow ¾"
3 Filling or emptying ½"
4 Thermal safety valve ½"
5 Smoke pipe/chimney 150/180*
*Recommended

KWB Classicfire 40–50 kW

Height, flue gas connection incl. bend: 185 cm

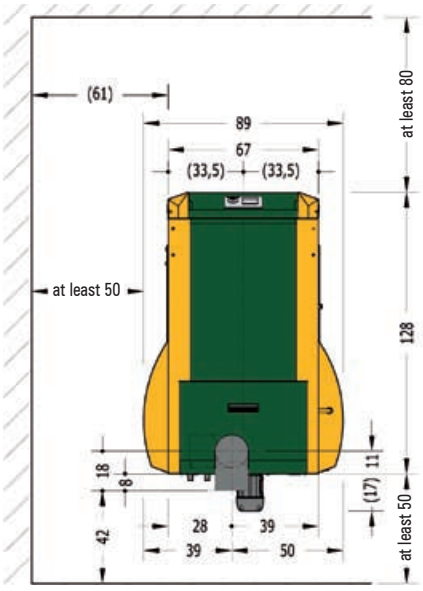


Ground plan



Boiler dimensions for boiler installation in cm		
Boiler type	Non-dismantled	Dismantled
SHV 20	80 × 145	60 × 134
SHV 30	80 × 145	60 × 134
SHV 40	90 × 155	70 × 144
SHV 50	90 × 155	70 × 144

All dimensions in cm



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		BOILER TYPE			
	Unit	SHV 20	SHV 30	SHV 40	SHV 50
Rated power	kW	20,0	30,0	40,0	50,0
Partial load	kW	14,0	14,0	19,5	25,0
Boiler efficiency at rated power	%	93,7	90,6	90,4	90,2
Boiler efficiency at partial load	%	84,9	84,9	88,4	91,8
Fuel thermal output at rated load	kW	21,4	33,3	44,4	55,4
Fuel thermal output at partial load	kW	16,4	16,4	21,8	27,2
Full-load burning time	h	8,4	5,5	7,3	5,6
Water side					
Water content	l	120	120	190	190
Water connection, forward flow	inches	6/4	6/4	6/4	6/4
Water connection, return flow	inches	6/4	6/4	6/4	6/4
Filling connection or emptying	inches	½	½	½	½
Thermal safety valve	inches	½	½	½	½
Water-side resistance at 20 K	mbar	2,9	6,5	10,8	16,9
Minimum boiler-entry temperature	°C	55	55	55	55
Max. operating pressure	bar	3	3	3	3
Permissible operating temperature	°C	95	95	95	95
Test pressure	bar	4,6	4,6	4,6	4,6
Buffer tank required		yes	yes	yes	yes
Minimum volume buffer tank	l	per kW 50 to 60 litres			
Flue-gas side					
Required draft at rated power	mbar	0,15	0,15	0,18	0,18
Required draft at partial load	mbar	0,07	0,10	0,10	0,10
Induced draft required		yes	yes	yes	yes
Flue gas temp. rated power (for chimney calculation)	°C	150	165	155	170
Flue gas temp. partial load (for chimney calculation)	°C	95	100	103	106
Flue gas mass flow at rated power	kg/h	49	74	98	123
Flue gas mass flow at partial load	kg/h	23	34	46	57
Flue-gas volume at rated power	Nm^3/h	38	58	76	96
Flue-gas volume at partial load	Nm^3/h	18	27	36	45
Smoke-pipe diameter	mm	150	150	150	150
Chimney diameter (approx. values)	mm	160	160	180	180
Min. chimney connection height	mm	1.750	1.750	1.850	1.850
Incline of the smoke pipe	°	at least 3°	at least 3°	at least 3°	at least 3°
Chimney design		Moisture-resistant			
Fuel					
Reliable fuels		Log-wood to max. 55 cm/large wood chips			
Water content		< 25 % by weight			
Fill area					
Fill area volume	l	140	140	210	210
Width, fill door	mm	330	330	330	330
Height, fill door	mm	370	370	370	370
Electrical system SHV					
Connection		230 VAC, 50 Hz			
Power	W	180	180	180	180
Weights					
Total weight	kg	627	627	774	774
Setup					
Minimum distance to wall – rear	mm	500	500	500	500
Minimum distance to wall – front	mm	800	800	800	800
Minimum distance to wall – lateral	mm	500	500	500	500

Legend on page 10

Technical data

		BOILER TYPE			
Type	**Unit**	**SHV 20**	**SHV 30**	**SHV 40**	**SHV 50**
Emissions according to test report		**TGM – VA**	**TGM – VA**	*	**WB**
Test report no.		HL 7196	HL 7196	**	BLT-006/98
O_2 content rated power	Vol%	6,8	6,6	6,0	5,3
O_2 content partial load	Vol%	7,0	7,0	6,4	5,8
CO_2 content rated power	Vol%	13,6	13,7	14,4	15,0
CO_2 content partial load	Vol%	13,7	13,7	14,1	14,5
Reference 10 % O_2 dry (EN 303-5)					
CO at rated power	mg/Nm³	167,0	320,0	327,0	334,0
CO at partial load	mg/Nm³	371,0	371,0	332,0	293,0
NOx at rated power	mg/Nm³	175,9	205,9	193,9	182,0
NOx at partial load	mg/Nm³	149,7	149,7	—	—
OGC at rated power	mg/Nm³	18,0	16,0	12,0	8,0
OGC at partial load	mg/Nm³	36,0	36,0	24,0	12,0
Dust at rated power	mg/Nm³	11,0	21,0	31,0	41,0
Dust at partial load	mg/Nm³	7,0	7,0	—	—
Reference 13 % O_2 dry (FJ – BLT)					
CO at rated power	mg/Nm³	121,0	231,0	237,0	243,0
CO at partial load	mg/Nm³	268,0	268,0	240,5	213,0
NOx at rated power	mg/Nm³	127,5	148,6	140,3	132,0
NOx at partial load	mg/Nm³	108,2	108,2	—	—
OGC at rated power	mg/Nm³	13,0	11,0	8,5	6,0
OGC at partial load	mg/Nm³	26,0	26,0	17,5	9,0
Dust at rated power	mg/Nm³	8,0	16,0	23,0	30,0
Dust at partial load	mg/Nm³	5,0	5,0	—	—
In accordance with § 15a BVG Austria					
CO at rated power	mg/MJ	75,0	143,0	152,0	161,0
CO at partial load	mg/MJ	166,0	166,0	153,5	141,0
NOx at rated power	mg/MJ	79,0	92,0	96,0	100,0
NOx at partial load	mg/MJ	67,0	67,0	—	—
OGC at rated power	mg/MJ	8,0	7,0	6,0	5,0
OGC at partial load	mg/MJ	16,0	16,0	11,5	7,0
Dust at rated power	mg/MJ	5,0	10,0	15,0	20,0
Dust at partial load	mg/MJ	3,0	3,0	—	—

* *Drawing inspection*
** *Values for intermediate sizes interpolated*
mg/Nm³ *Milligrams per standard cubic meter (1 Nm³ under 1013 mbar at 0 °C)*

Bus system – conditions

- Bus cable: CAT.5e, S/FTP; 4 × 2 × AWG24, length max. 850 m; underground installation: CAT.5e, 4 × 2 × 2 × 0.5 mm².
- Lay out in a separate conduit (not together with 230/400 V AC).
- Network stations in one line (no branches, no ring).
- If the boiler control unit in the boiler room is used, it is necessary to install an empty base with bus connector CAT.5e (not possible in combination with the KWB Comfort SMS).
- Max. 2 digital remote control units after a heating circuit expansion module or heating-system master board (with voltage supply). Each heating circuit module must be powered with 230 V 50 mains voltage for the heating circuit module itself and for any connected digital remote control units, pumps and mixer servomotors.
- For each heating circuit, an analogue room control unit (no bus station) can be used independent of the bus stations. Wiring is the same as for a room sensor.

Note – general constructional conditions

Always comply with local statutory submission, construction and execution regulations that apply to you as a KWB system user! You can obtain these regulations, for example, from the architect or responsible authorities. Adherence to and verification of the local statutory regulations is a condition for our warranties and for insurance coverage. KWB does not accept any liability, nor does it offer any warranties for any type of constructional measures. Proper execution of constructional measures is the sole responsibility of the system owner. Your contractor or your architect provides information in this regard! As a biomass heating system user, you may be entitled to receive specific regional subsidies. Inquire promptly about time limits and procedures for handling subsidy applications. Comply with the dimension specifications in the installation examples and technical specifications. This information makes no claim to be an exhaustive treatment of the issues at hand nor does it suspend any conditions imposed by the authorities.

Boiler room

Concrete floor, rough or tiled. All materials for floors, walls, ceilings to be fire resistant F90*1; boiler room door to be executed as an automatically closing fire door (T30*2) that opens in the direction of escape, connection door to the fuel storage room to be executed as an automatically closing fire door (T30*2). Boiler room window non-opening G30*3; non-closing intake air opening 5 cm^2 per kW rated power of the heating system, but not less than 400 cm^2. The supply air ducting must be routed directly into the open; if it crosses other rooms, the air duct must feature an F90*1 envelope; a protective grille with a mesh width < 5 mm must be fitted on the outside of ventilation openings to the outside.

Permanently installed lighting and electrical supply to the heating system; light and labelled stop switch of the heating system in an easily accessible location outside the boiler room in the vicinity of the boiler room door. A portable fire extinguisher (12 kg fill weight; EN 3) must be installed outside the boiler room near the boiler room door. The boiler room as well as water lines and district heating pipes must be frost resistant. No storage of flammable materials in the boiler room; no direct connection to rooms where flammable gases or liquids (garage) are stored.

Chimney

Due to the high efficiency of the KWB boiler, the chimney design should be resistant to moisture (FU). A moisture-resistant chimney design means that there will be no moisture penetration or damage to the brickwork although the temperature level in the flue-gas path is permanently below the flue-gas dew point DIN 18160! The approximate values for the chimney diameter are stated in the specifications. They are valid for the applicable system size, given average constructional conditions, i.e.: Effective chimney height 8 – 10 m, 1.5 m smoke pipe length, 2 Segment bends each 90°, 1 contraction, 1 T-connection at 90°. Comply with the specifications in the cross-section diagrams provided by the chimney manufacturer. If conditions differ or are less favourable in terms of space, it is necessary to carry out a chimney calculation according to DIN 13384. A data entry sheet as an electronic form is available from KWB. Upon request, KWB will provide the chimney calculation based on the information provided on the form. This is a chargeable service. The local expert for these issues is your responsible chimney sweep. It is advisable to involve your chimney sweep during the planning phase as it is he who will have to issue the acceptance certificate for the flue gas system.

Electrical connection

Connection to the mains supply is via the main switch of the boiler and is to be installed according to regulations (according to EN 60204-1 electrical installation of machinery – general requirements). Single-phase mains supply: 230 V AC, 50 Hz, fusing 10 A.

Required connections to be provided by customer: Supply, 3-pole (L/N/PE) 10A, lightning arrester type "C" at the distribution board of the house (recommended as lightning protection), escape switch ("stop switch")

Photo right: The Scheibe family from the German state of Hesse is always completely satisfied with their KWB Classicfire: Classic, and yet it generates comfortable heat economically and reliably ...

*1 F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501
*2 T30 in accordance with ÖNORM B 3800, EI_2 30-C in accordance with ÖNORM EN 13501
*3 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501

Specialist for biomass heating systems

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KWB
Biomass Heating Systems

We provide energy for Life!

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