

# KWB Powerfire

Wood-chip and pellet heating system



Available from your KWB installer / heating engineer



Technology and planning  
**Wood-chip and pellet heating system**  
**KWB Powerfire 130-300 kW**

We provide energy for life!



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## Pioneering 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<sub>2</sub> 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.

## Local energy resources: Wood chips

As a fuel wood chips offer the combination of regional value creation, cost-effective generation of heat, and the convenience of an automatic firing system in one. All types of natural recovered wood, e. g. storm-damaged wood, bark, branches, and even residues from carpenters' shops and joiner's workshops, are suitable for the production of wood chips. Wood chips are primarily produced and sold by local farmers who chip the wood after a drying phase of several months. Careful processing and drying enable optimal storage capability and trouble-free heating operation with small amounts of ash and low emissions.



## Fuel of the future: Pellets

Pellets are manufactured of wood chips without synthetic additives and are constantly inspected for quality and safety by in-house and external controls. Pellets are environmentally friendly in production and use, create new jobs, and when they are burned the CO<sub>2</sub> content of the atmosphere remains the same. In addition, due to high energy content, convenient possibilities for delivery and storage, etc. pellets are the ideal fuel for automatic heating systems.



## Rely on quality

All KWB heating systems are Austrian quality products and satisfy strictest tests, and regulations. Internal and external quality assurance systems ensure the best workmanship and maximum functional reliability. Our constant goal is to offer manufacturing quality that surpasses the industry average – hence you can rely on us.

## More security, guaranteed

At KWB one of our top priorities is to ensure that our systems prove themselves optimally under all conditions.

Who ensures highest quality standards like KWB can comfortably offer the best guarantees:

- **3 years guarantee on all biomass heating systems if a maintenance contract is concluded.**
- **8 years guarantee on the heat exchanger if a working return temperature control is installed**
- **15 years guarantee on spare-parts availability**

## Award-winning

“KWB Biomass heating systems stands for the highest quality. The awards that we have won are confirmation of the path we are pursuing, and which we will consistently continue to pursue.”

 <p>Test result 2,5 Pellet boiler Foundation for quality tests in Germany</p>	 <p>Test result Good, Foundation for quality tests in Austria</p>	<p>Quality management</p>  <p>EN ISO 9001 Zertifikat Nr. 20 100 9755 www.tuv.at</p>		<p>Safety management</p>  <p>OHSAS 18001 Zertifikat Nr. 20 116 72002276 www.tuv.at</p>	 <p>Innovation prize 2004 for TDS Powerfire</p>	 <p>Energy Globe Styria 2004 for TDS Powerfire</p>
<b>QUALITY</b>				<b>INNOVATION</b>		
 <p>Blue Angel eco-label for KWB Easyfire</p>	 <p>Green Power (Ökostrom) customer</p>	 <p>Eco-label Austria</p>	 <p>Member of the Climate Alliance</p>	<p>Conformance with EC directives</p> 	<p>Emissions and efficiency test</p>  <p>Wieselburg</p>	<p>Environmental management</p>  <p>EN ISO 14001 Zertifikat Nr. 20 104 3133 www.tuv.at</p>
<b>ENVIRONMENT</b>						

## KWB Powerfire

Due to its special features the KWB Powerfire is suitable for the heat supply of regional district heating networks, industrial enterprises, as well as multi-storey and residential buildings. Customers of KWB and operators of KWB Powerfire are heat supply cooperatives, farmers, contracting companies, private and commercial housing agencies, as well as public institutions.

The KWB Powerfire is extremely flexible with the choice of fuel to be used – you can use wood chips type G30 and G50 in accordance with ÖNORM M7133 with up to 45 % water content or EN14961-1 wood chips of type P16B, P45A as well as wood pellets in accordance with ÖNORM M7135 or DIN Plus and wood pellets of A1 and A2 quality class in accordance with EN14961-1.

The KWB Powerfire TDS 150 was awarded the “Energy Genius 2004” prize for innovation from the Federal Ministry of Agriculture, Forestry, Environment and Water Management in co-operation with the Upper Austrian “Energiesparverband” and received the “Energy Globe Styria Award 2004” in the special category for the “most innovative product”.

TDS 130  
TDS 150



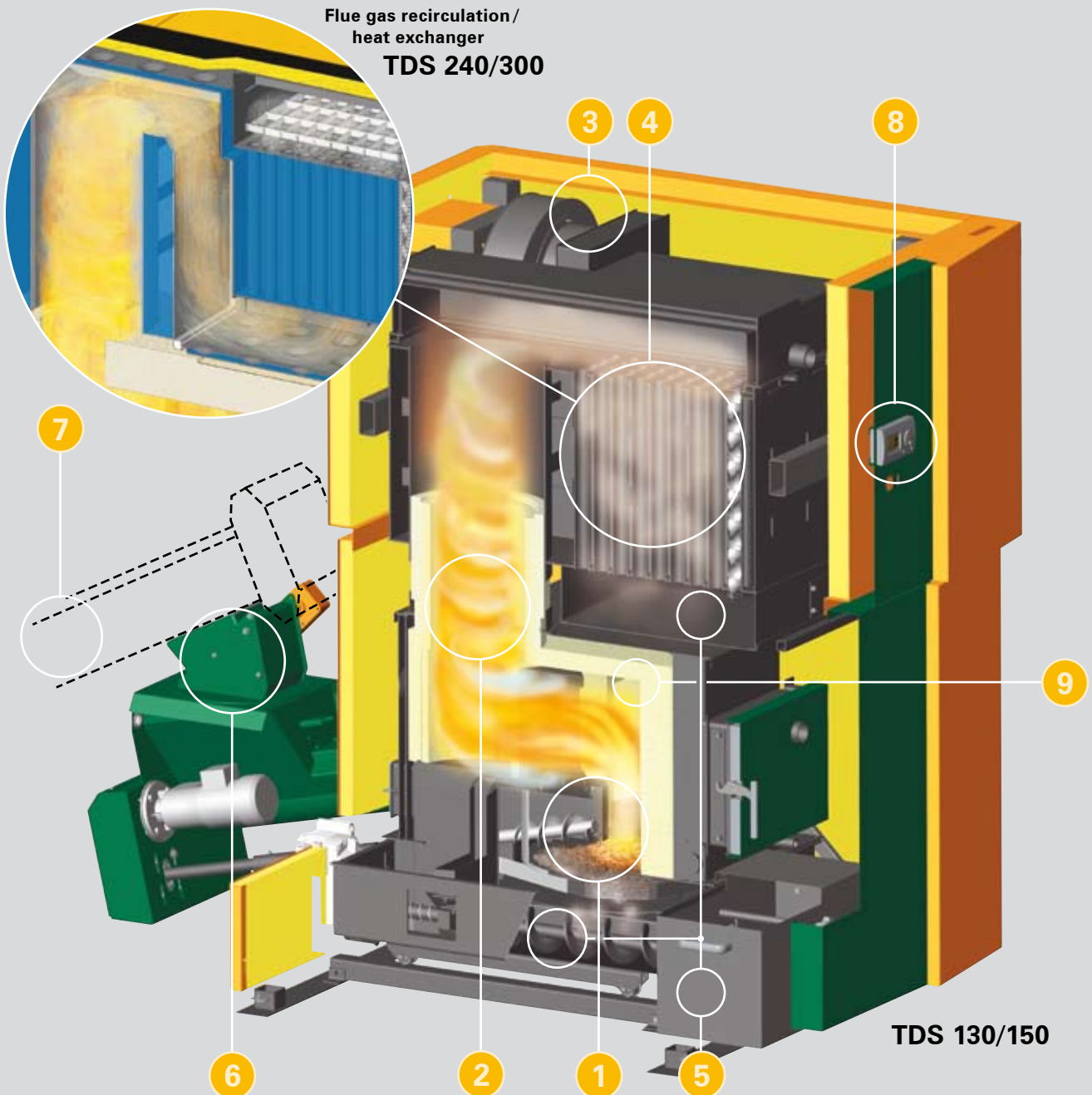
Energy Globe Styria  
2004  
for TDS 150

TDS 240  
TDS 300



## KWB Powerfire 130–300 kW

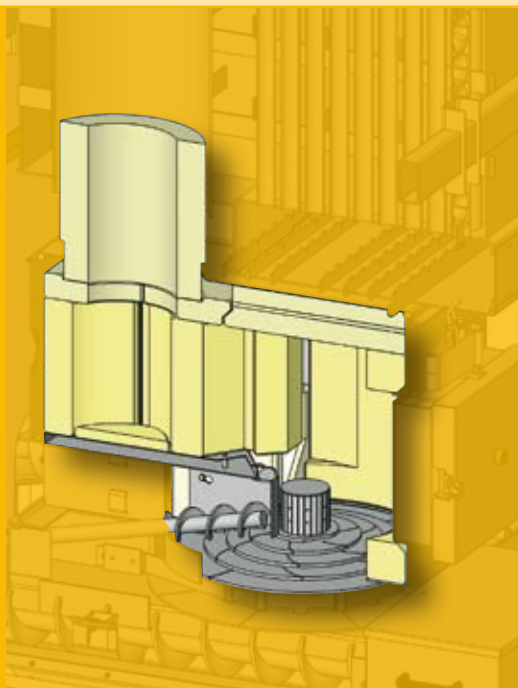
1. **Rotary grate combustion system:** Innovative, robust, quiet fuel bed, optimal gasification conditions, self cleaning
2. **Cyclone combustion chamber:** Innovative, optimized flow dynamics, efficient fly ash separation, low emissions
3. **Lambda control system:** Low emissions, high efficiency
4. **Heat exchanger:** Compact construction, high efficiency, effective fly-ash separation
5. **Ash removal system:** Automatic, ash compaction, fill-level monitoring, ash removal in container (240 l) optional
6. **Safety system:** Gas-tight, burnback-proof fire shutter (for TDS 130/150 also with cellular wheel sluice if desired)
7. **Fuel extractor:** Reliable conveyor technology for rigorous individual requirements
8. **Operating and control system KWB Comfort 3:** Innovative, easy-to-operate, automatic, and unique
9. **Flue gas circulation:** Required for TDS 130/300 for fuels with water content < 20 % (pellets and dry wood chips)



## UNIQUE

### Innovative combustion technology: Rotary grate combustion system and cyclone combustion chamber

Particularly clean combustion, high efficiency, and environmentally friendly as well as economic operation are guaranteed by combustion technology developed and patented by KWB biomass heating systems. The heart of the KWB Powerfire is the **rotary grate combustion system** consisting of side insert, rotary grate and ash-removal system. The vertically standing **cyclone combustion chamber** in which rotating flow occurs in the well-designed air duct, is installed downstream. This flow brings about a complete and fast mixing of combustion gas and secondary air to achieve **complete burnout** and the **lowest emissions** as well as the **best possible separation of fly-ash particles**.



## INNOVATIVE

### Combustion control concept of the KWB Powerfire

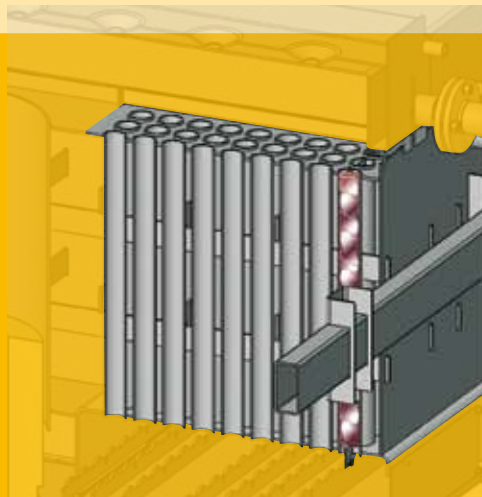
Adapted to the combustion system an innovative control concept was especially designed for this type of boiler. In addition to the **lambda and combustion chamber temperature control system**, the key elements of this control concept are the intelligent **fill-level control**, the negative pressure control and the innovative **complete-combustion control on the grate**. The combination of these four elements guarantees **optimum gasification conditions** in the grate zone and **lowest emissions**. This control concept enables automatic matching of regulation to fuel for a road range of fuels with different water content, grain size, and energy content, and is reliable even when burning fuels with a high ash content.



## ECONOMICAL

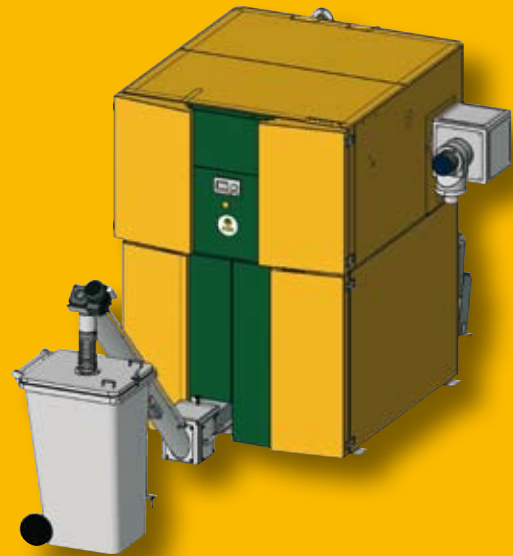
### Heat exchanger

Thanks to the compact arrangement of the heat exchanger, the flow of flue gas into the reversal chambers is forced to change direction several times, which enables **optimal separation of fly-ash and fine-ash**. The newly developed, innovative and fully automatic heat-exchanger cleaning system together with the turbulators ensures **regular cleaning** of the heat exchanger pipe and a **turbulent flow** to achieve **highest heat-exchange rates** and thus **economy**.



**CONVENIENT****KWB ash-removal system**

The ash-removal system not only provides **efficient ash removal** from the rotary grate but also collects separated fly-ash fractions in the downstream cyclone combustion chamber. Grate ash is conveyed and compacted in an **attached ash container**. For more convenience this ash can be conveyed into an external **ash container** (240 l) which significantly extends the emptying interval. The cleaned ash fraction collected in the reversal chamber is conveyed into an additional installed container (in two ash containers for the TDS 240/300 ).

**VERSATILE****KWB Comfort 3 control unit**

The **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. Further advantages include controlling the heating system by means of SMS text messages with the **KWB Comfort SMS** and visualisation and remote maintenance using the **KWB Comfort Visio**. The software package KWB Comfort InterCom is also a new entrant in the product range, and represents an interface for data transfer between the KWB controller and other third-party systems. Now, a solar system too can be controlled using the KWB Comfort Solar controller.



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**RELIABLE****KWB safety system**

The safety system was designed with the objective of maximum reliability. It consists of the gas-tight and burnback-proof **fire shutter** (available with additional cellular wheel sluice on request for the TDS 130/150), **emergency fire extinguisher**, **temperature-monitoring device**, **hopper with opto-electronic fill-level control**, **overflow protection**, **vertical shaft** and **safety thermostat (pyrostat)**. The fire shutter and emergency fire extinguisher also work during emergencies, such as during a power cut – thus providing optimum safety.



## KWB Powerfire TDS 130 and TDS 150

### KWB conveyor systems: The optimum customer-specific solution

The KWB fuel-extractor system with floor-level stirrer (stirrer diameter: 2.5 to 5.5 m) and conveyor screw on a massive, hollow shaft supported by two bearings, is adapted to on-site conditions and tailored to the specific needs of the customer. Fuel storage rooms can be square, rectangular or round, and can be situated above the level of the boiler room, at the same level, or even below the level of the boiler room (please see KWB installation examples starting on page 16).

The fuel extractor is suitable for wood chips to grain size G50 in accordance with ÖNORM M7133 or B1 P16B in accordance with EN14961-1 and for burning wood pellets diameter 6mm and 8mm in accordance with ÖNORM M7135 or DIN Plus as well as wood pellets of A1 and A2 quality class in accordance with EN14961-1.



KWB  
heavy-duty gear unit



KWB  
conveyor screw



Section of a KWB  
conveyor screw

## KWB fuel extractor – your advantages

### Reliable, long service life

- **Long service life and high-level wear-resistance** of the screw thanks to stainless steel spirals in the feed area and a maintenance-free, double-sealed heavy-duty gear unit in trough form
- **No overfilling of the screw trough** due to progressively ascending spirals, asymmetric opening, and reverse travel screw.
- **The screw is not buoyed upward** in the trough due to optimised trough shape.

### Convenient and individual

- **Efficient emptying** of the bunker even with larger stirrer diameters due to uniform contact force of the articulated-blade rotary stirrer over the entire diameter.
- **Complete utilisation** of storage room space is possible due to different ascending-screw implementations.  
**Customer-specified screw length** (lengths greater than 12 m on request)
- **Low power consumption** by avoiding mechanical resistance.

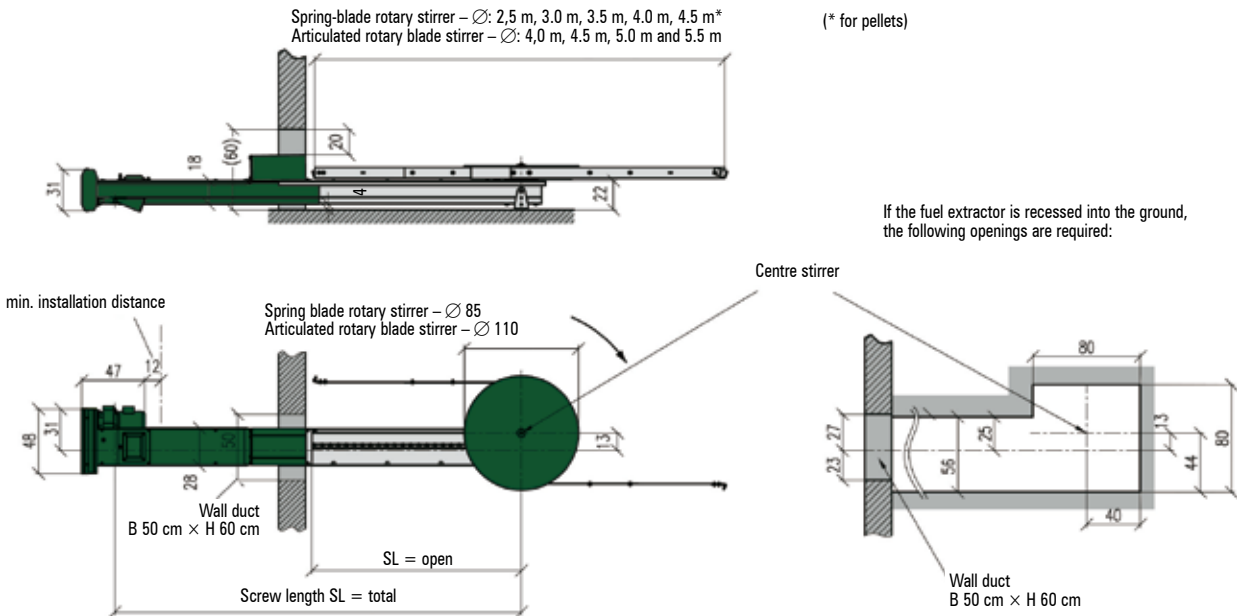


## KWB Powerfire TDS 130 and TDS 150

### KWB Conveying Systems – optimal solution for every construction situation

#### Floor-level rotary-blade stirrer

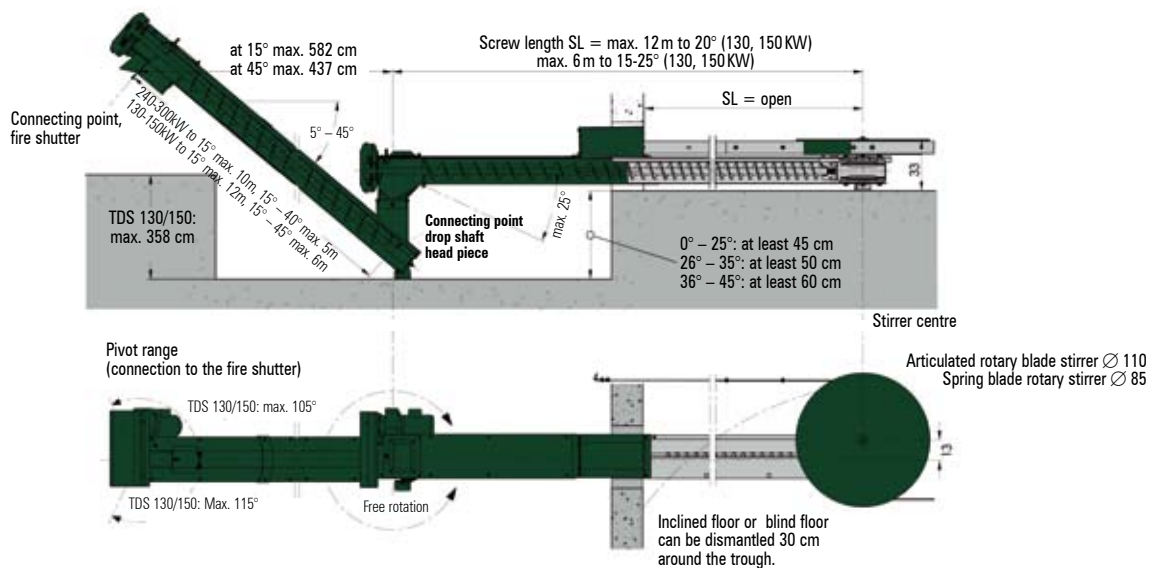
The floor-level rotary-blade stirrer is available in two different designs depending on requirements: As a spring-blade rotary stirrer (stirrer diameter: from 2.5 up to 4.0 m) and as articulated rotary-blade stirrer (stirrer diameter: from 4.0 to 5.5 m stirrer diameter). The floor-level rotary-blade stirrer can be implemented for operation with wood chips to 150 kW and with exclusive pellet operation to 300 kW.



#### Ascending screw

For situations where there are differences in the level between storage room and boiler room for horizontal fitting of the stirrer, there are two innovative ascending-screw variants available from KWB: The **ascending screw with upward transfer (only with pellets up to 150 kW)** and the **ascending screw with downward transfer** (possible up to 150 kW for wood chips and 300 kW for pellets).

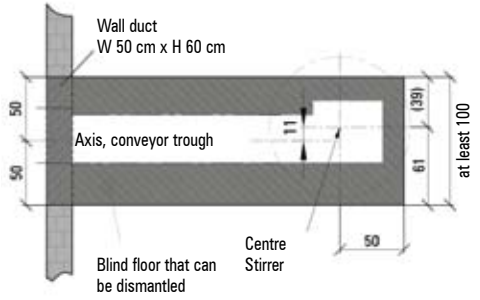
#### Ascending screw with downward transfer



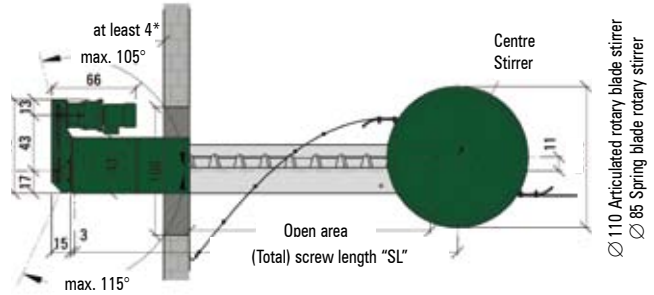
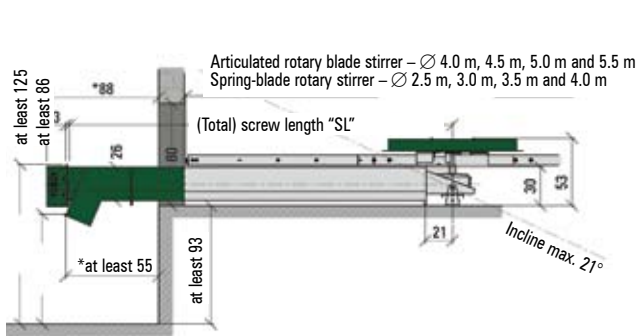
## KWB Powerfire TDS 240 and TDS 300

### Floor-level rotary-blade stirrer

A separate conveying trough with conveying screw was developed to meet the requirements of the KWB Powerfire 240–300 kW; it is characterised by special robustness and resistance to wear. In combination with the standard stirrer, stirrer diameters ranging from 2.5 to 5.5 m can be implemented.



Plan the depression very carefully and ensure precise execution during construction! Deviating natural dimensions and planning errors can cause massive problems and additional costs when installing the fuel extractor!

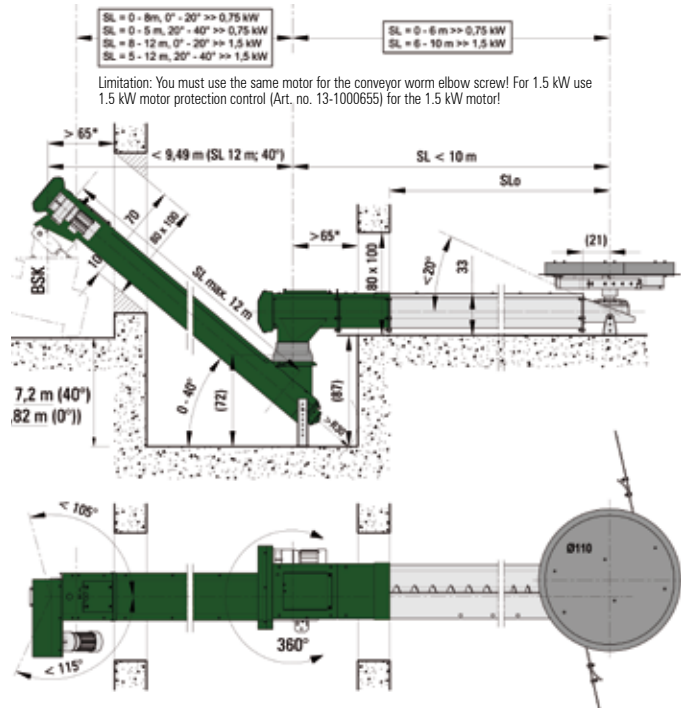
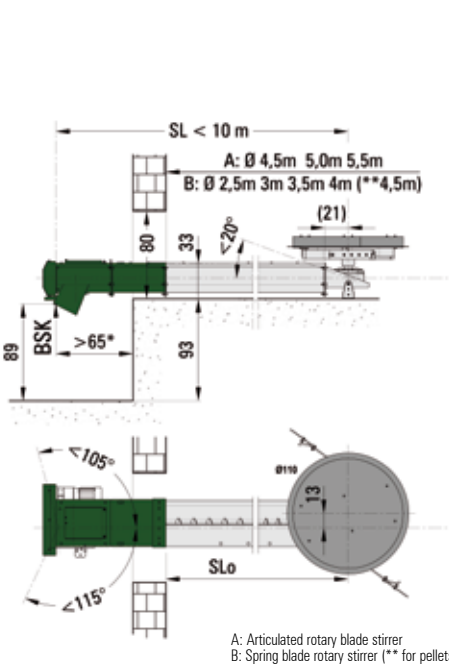


\*at least Distance to the support bearing of the fire shutter at a horizontal install angle of 0°

\* If the fuel extractor is installed at an incline (not flush with the system) then additional clearance of 25 cm to the rear wall must be planned!

Ø 110 Articulated rotary blade stirrer  
Ø 85 Spring blade rotary stirrer

## Elbow worm with downward transfer for KWB Powerfire 240/300 kW with wood chip operation



\* Please also plan a distance of at least 25 cm to the wall behind the stoker when the conveyor system is installed at a slope (NOT flush with the system)!

Caution: Create a sloped or dead floor 30 cm that can be dismantled around the trough

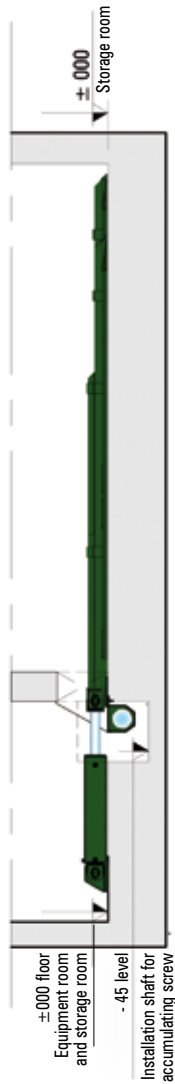
Please also plan sufficient number of vents and free space in the walls and ceilings – transportation, installation and maintenance are not possible otherwise!

## KWB Powerfire TDS 240 and TDS 300

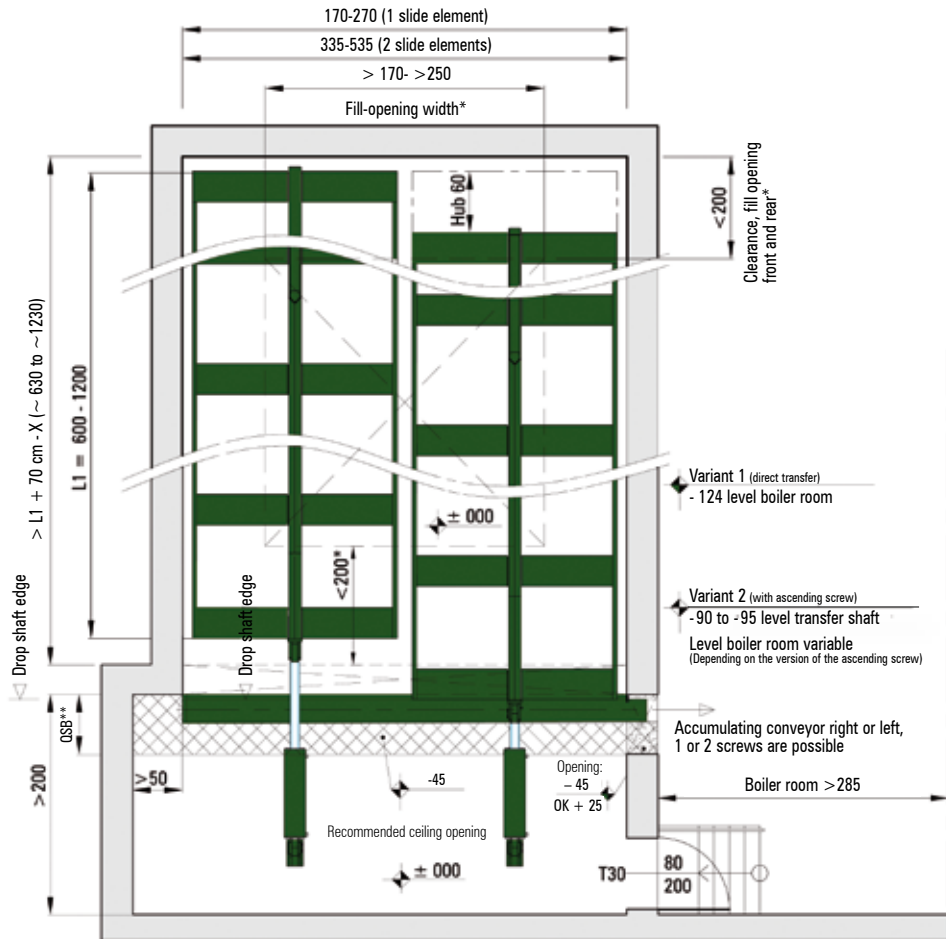
### Moving floor

Ideally the KWB moving floor extractor is used in large-area storage rooms and in conjunction with the KWB Powerfire wood-chip and pellet heating system. Thus the entire storage room volume can be optimally utilised. Well-designed technology and robust construction of the accumulating conveyor and ascending screws ensure optimal fuel transport to the heating system.

Sectional view from the right



Sectional view from above (example: 2 slide elements, 1 accumulating conveyor)



\* All information for moving floor and max. allowed height are approximate values – precise individual KWB planning and construction planning are strictly required.

\*\* Accumulating shaft width: 2 accumulating conveyors >70 cm, 1 accumulating conveyor >50 cm Comply with all local regulations (fire protection, industrial safety, escape routes, railings, coverings, etc.)

All lengths in [cm]	Width of the slide elements					
	150		200		250	
Qty. of slide elements:	1	2	1	2	1	2
Storage room width:	170	335	220	435	270	535
Fill-opening width:	170	250	220	250	250	250
<b>Max. allowed height of wood chips in the storage room***</b>						
Nominal length 6 m:	1.490		980		750	
Nominal length 8 m:	980		700		530	
Nominal length 10 m:	740		530		390	
Nominal length 12 m:	580		410		310	

\*\*\* Maximum allowed heights for standard wood chips with W25! For wood chips with high water content and/or a high proportion of hardwood, the max. allowed height may need to be significantly reduced – your KWB partner would be pleased to advise you! If the values are exceeded damage can occur! With intermediate values always select the lower value.

## 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 32 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  $\pm 5$  °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 buffer 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.



## KWB Comfort SMS

Use your own mobile phone to query the actual operating states and actively control your heating system (holiday program, party operation). In addition to switching the heating system on and off, actual operating states can be queried or adjustments can be made for heating circuits, DHWC, buffer tanks, etc. In addition alarm messages are sent to the mobile phone.

The sender receives acknowledgment of commands that have been executed through an SMS reply. Creation of commands and queries is simplified by the use of SMS templates that can be transmitted by the KWB Comfort 3 to the respective mobile phone. KWB Comfort SMS is available in German, English, Italian, French, Spanish and Slovenian.



## KWB Comfort Visio

KWB Comfort Visio is a new component of the KWB Comfort series for visualisation, remote monitoring and remote control of your KWB heating system via PC. The design of the KWB Comfort Visio is revolutionary with respect to project planning and commissioning. Attach it, switch it on, and you are on your way – the KWB Comfort Visio adapts itself automatically to your heating system. KWB Comfort Visio is available in English and German.

### Monitoring and operation

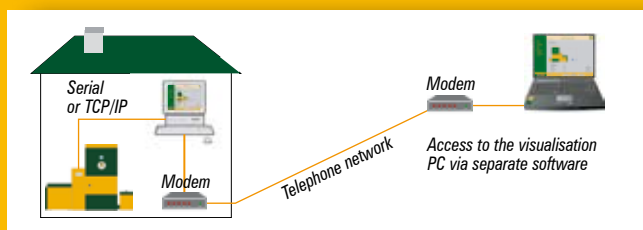
Operating values of boiler, heating circuits, DHWCs and buffer tanks can be displayed with the KWB Comfort Visio. All the configuration parameters of the heating system are displayed and can be changed on the visualisation interface. In addition, KWB Comfort Visio offers a comprehensive alarm management system, consisting of alarm statistics and log, as well as an extensive help system for the specific alarms.

### Archiving

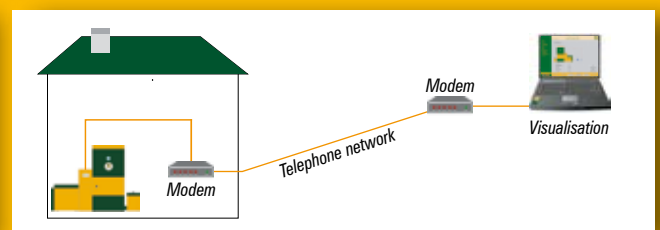
Use an on-site computer to take advantage of the comprehensive data recording and evaluation possibilities of the KWB Comfort Visio.

### Remote maintenance

The heating system can be accessed from any location via modem. Thus the heating system can be monitored and you can intervene if necessary. This also allows KWB customer service to remotely maintain the customer's heating system.



**Possibility 1: Visualization PC near the system**



**Possibility 2: No PC near the system**

## KWB Comfort InterCom

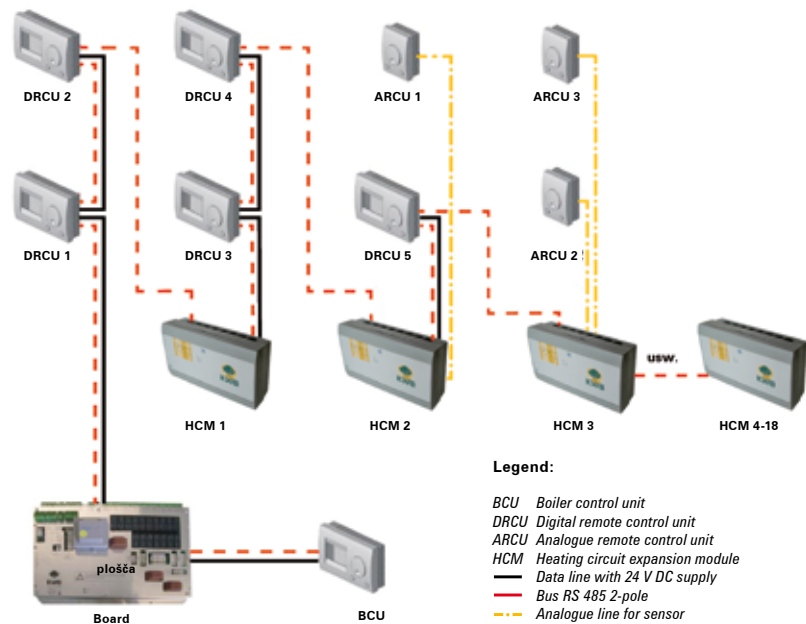
KWB Comfort InterCom is an interface for data exchange between the KWB Comfort control system and external systems, such as higher-level control or visualization systems, central building control systems, etc. The data is exchanged via serial connection, network connection or analogue modem connection.

All boiler operating status parameters as well as individual alarms can be read out on the KWB Comfort control system. In addition several parameters such as "Switch system on/off" can be changed by external systems in the KWB Comfort control system.

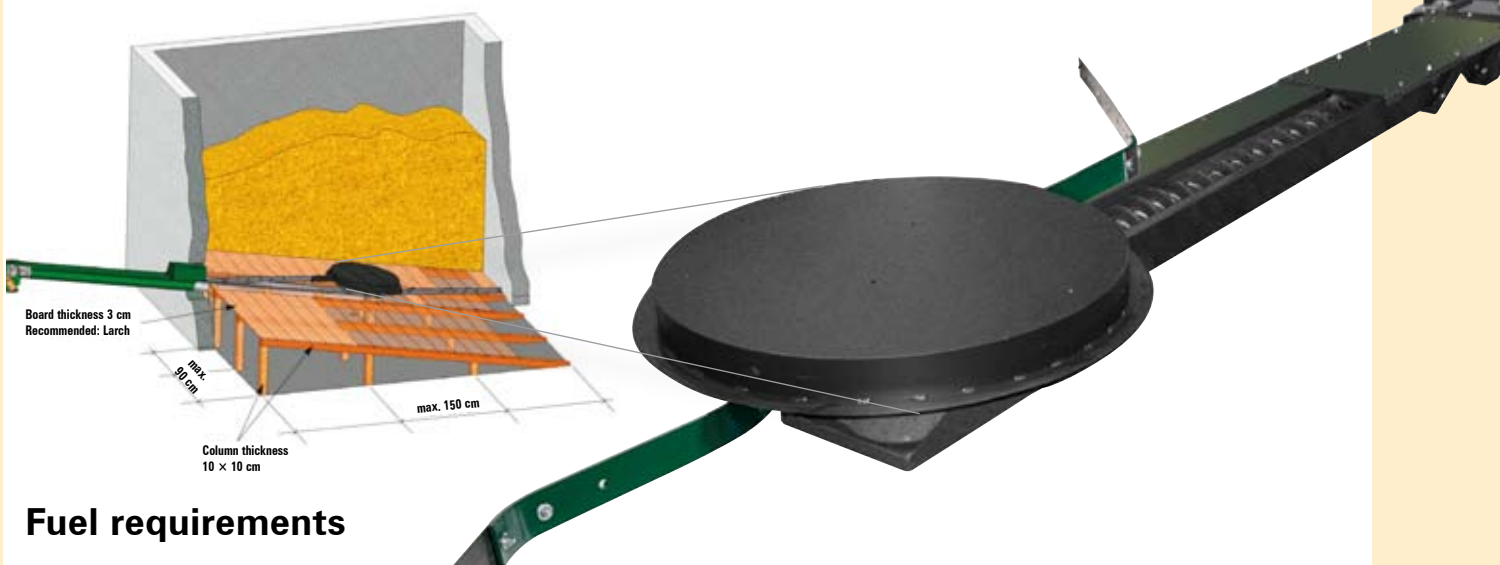


## Bus system – conditions

- Bus cable: CAT.5e, S/FTP; 4 × 2 × AWG 24, maximum length 850 m, for underground installation: CAT.5e, 4 × 2 × 0.5 mm<sup>2</sup>
- 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 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 base board (with voltage supply). Each heating circuit module must be powered with 230 V 50 Hz 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.



## Inclined floor view with fuel extractor



## Fuel requirements

Consumption for wood chips	
Heating load of the building [kW]	Annual consumption* [m <sup>3</sup> /a]
130	325
150	375
240	600
300	750

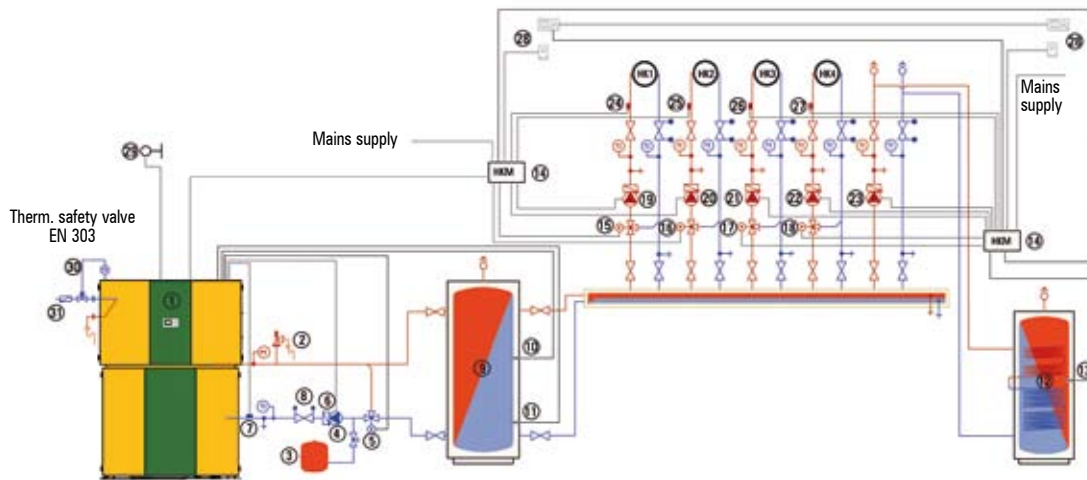
\* Using wood chips with 25 % water content and size G30 according to ÖNORM M 7133  
Consumption factor per year: 2,5 m<sup>3</sup> per kW heating load

Pellet consumption	
Heating load of the building [kW]	Annual consumption* [kg/a]
130	52,000
150	60,000
240	96,000
300	120,000

Consumption factor per year: 400 kg per kW heating load

## IMPLEMENTATION RECOMMENDATION: HEAT PROVISION FOR A BUILDING

With weather-compensation control system and expansion modules

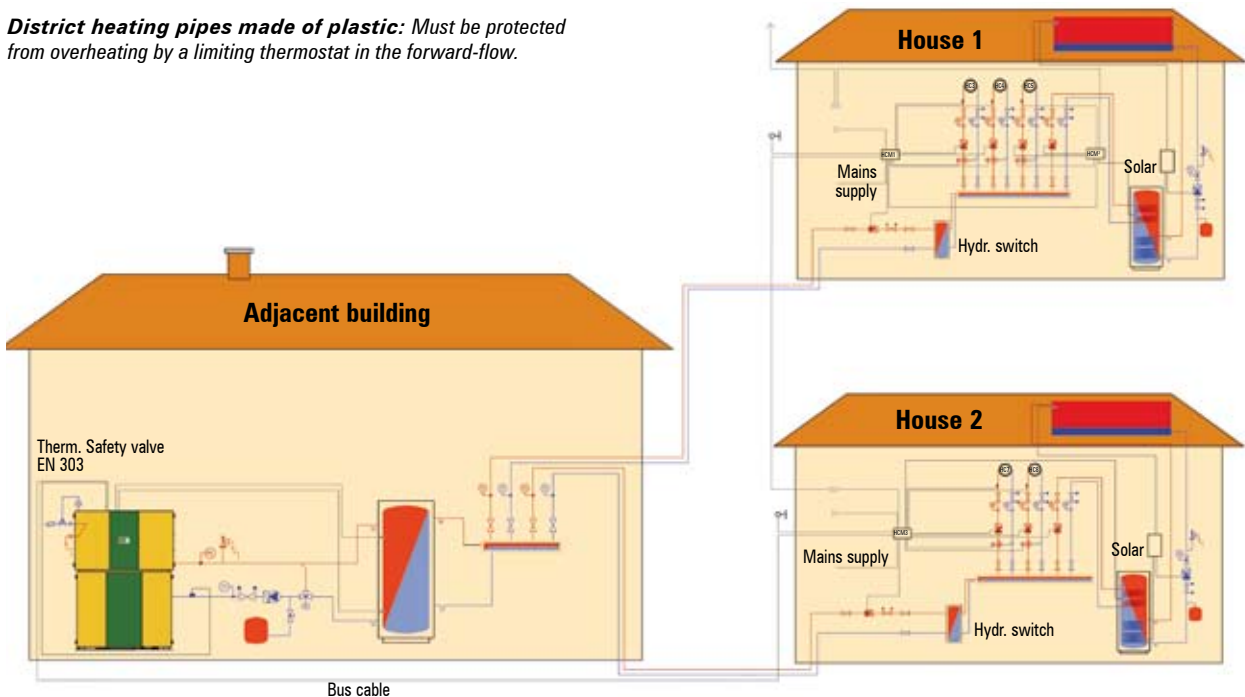


**Low-temperature heating circuits (wall or floor heating):** Heating circuit must be protected from overheating by a limiting thermostat on the flow side (HC-pump off, mixer closed).

- |   |                                     |                                       |
|---|-------------------------------------|---------------------------------------|
| 1 Boiler  | 11 Buffer tank sensor 2             | 22 Pump HC4                           |
| 2 Safety valve  | 12 DHWC                             | 23 DHWC pump                          |
| 3 Pressure expansion vessel   | 13 DHWC sensor                      | 24 Flow temperature sensor HC1        |
| 4 Pump of return temperature control or mixing valve with accurator | 14 Heating-circuit expansion module | 25 Flow temperature sensor HC2        |
| 5 Constant return temperature control                               | 15 Mixer HC1                        | 26 Flow temperature sensor HC3        |
| 6 Non-return valve  | 16 Mixer HC2                        | 27 Flow temperature sensor HC4        |
| 7 Return temperature sensor   | 17 Mixer HC3                        | 28 Remote control digital or analogue |
| 8 Regulating valve  | 18 Mixer HC4                        | 29 Outdoor temperature sensor         |
| 9 Buffer tank   | 19 Pump HC1                         | 30 Thermal safety valve               |
| 10 Buffer tank sensor 1   | 20 Pump HC2                         | 31 Non return valve                   |
|   | 21 Pump HC3                         |                                       |

## IMPLEMENTATION RECOMMENDATION: DISTRICT HEATING NETWORK

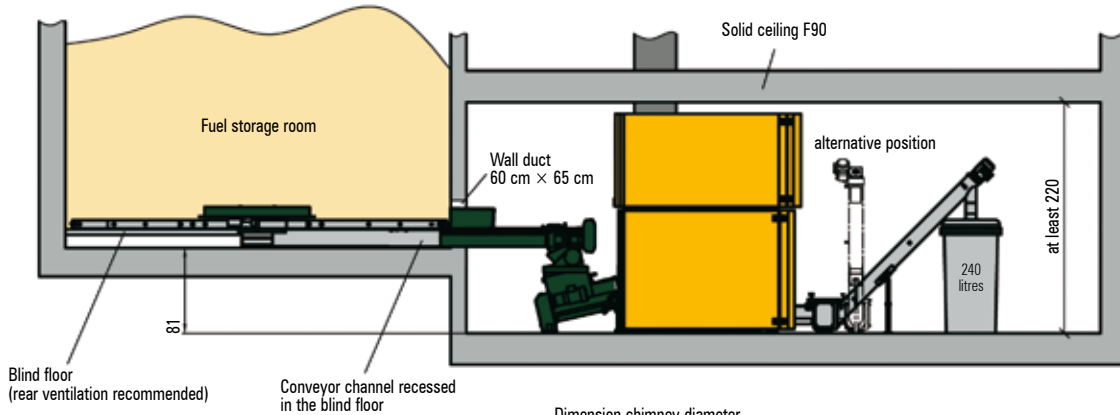
**District heating pipes made of plastic:** Must be protected from overheating by a limiting thermostat in the forward-flow.



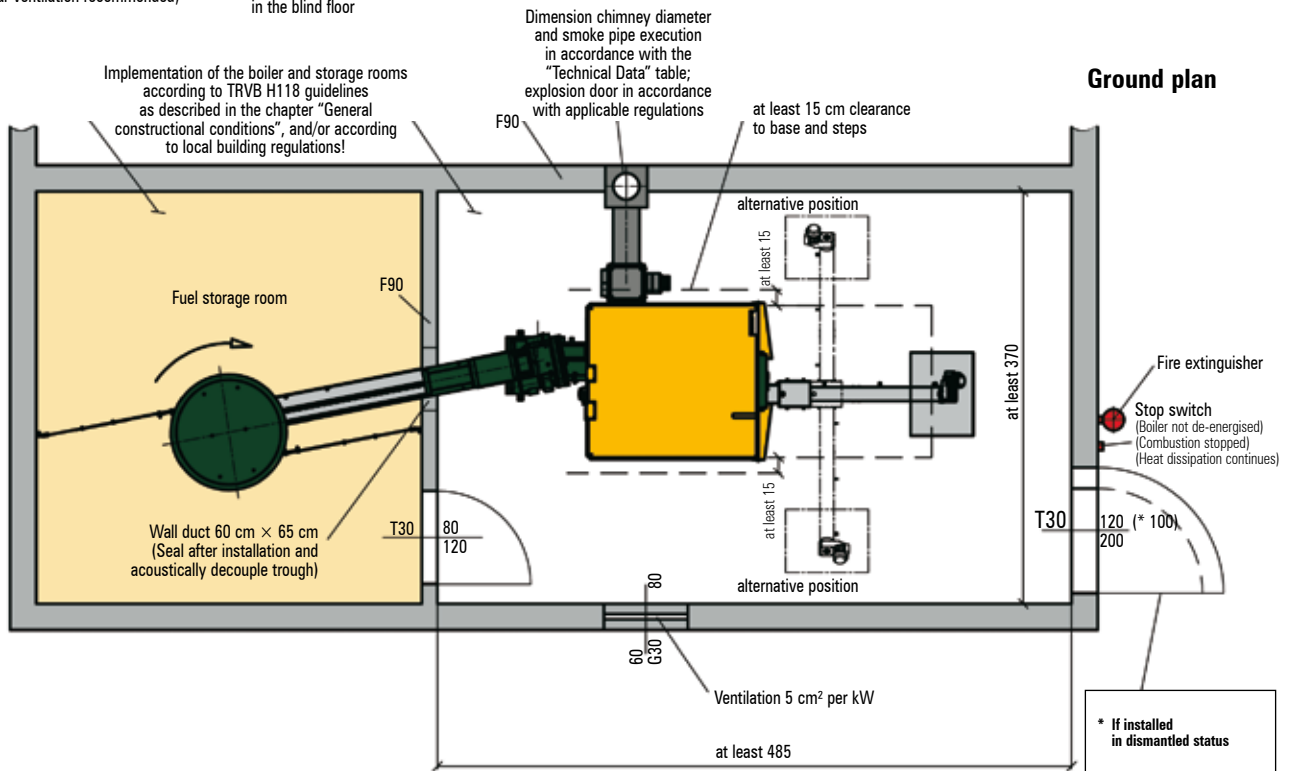
## KWB Powerfire 130–300 kW with fuel extractor from adjacent storage room and ash removal system in an external ash container

Installation example: KWB Powerfire 130/150 kW with fuel extractor and external ash removal system

Outline

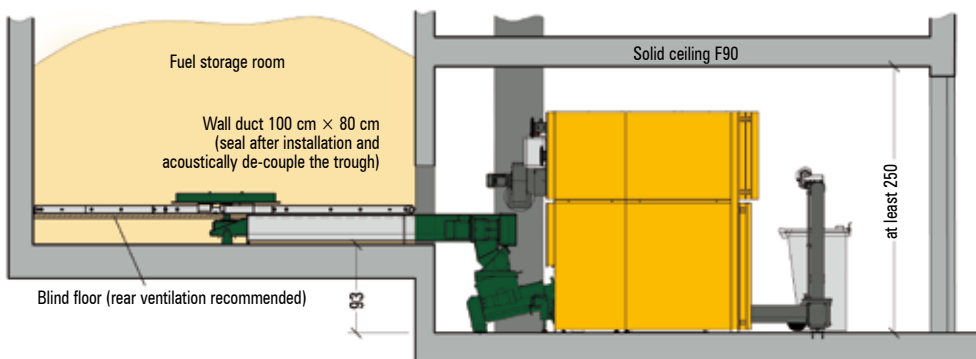


Ground plan



Installation example: KWB Powerfire 240/300 kW with fuel extractor and external ash removal system

Outline



F90 in accordance with ÖNORM B 3800, REI90  
 in accordance with ÖNORM EN 13501  
 T30 in accordance with ÖNORM B 3800, EI-30-C  
 in accordance with ÖNORM EN 13501  
 G30 in accordance with ÖNORM B 3800, E30  
 in accordance with ÖNORM EN 13501  
 All dimensions in cm

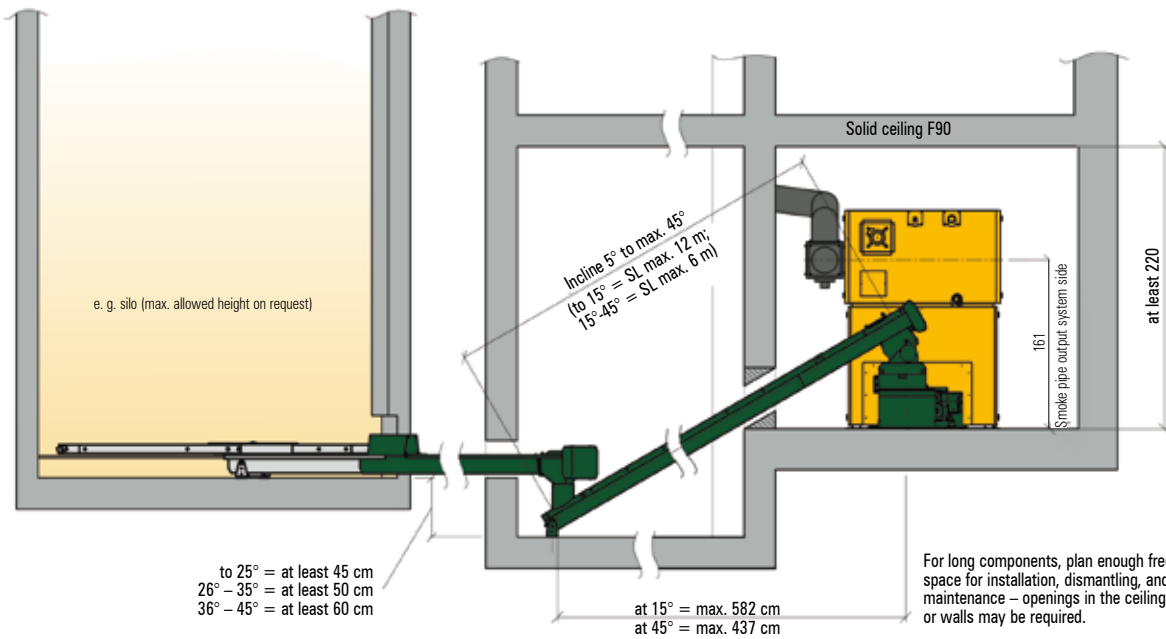




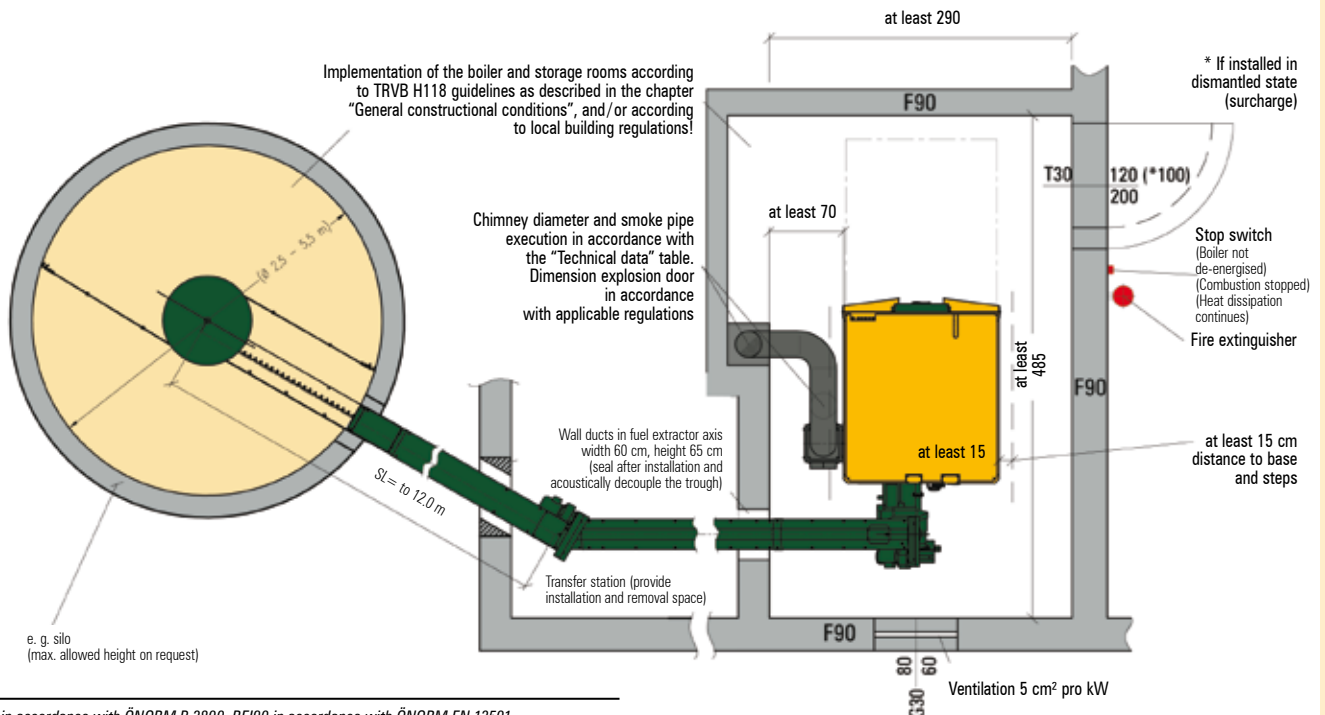


## KWB Powerfire 130–150 kW with fuel extractor from lower level storage room and ascending screw with drop shaft

### Outline



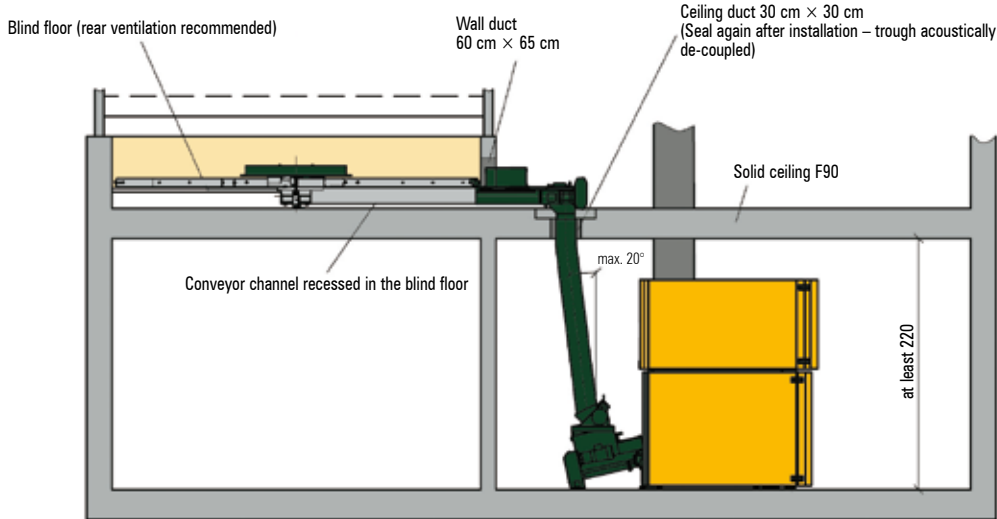
### Ground plan



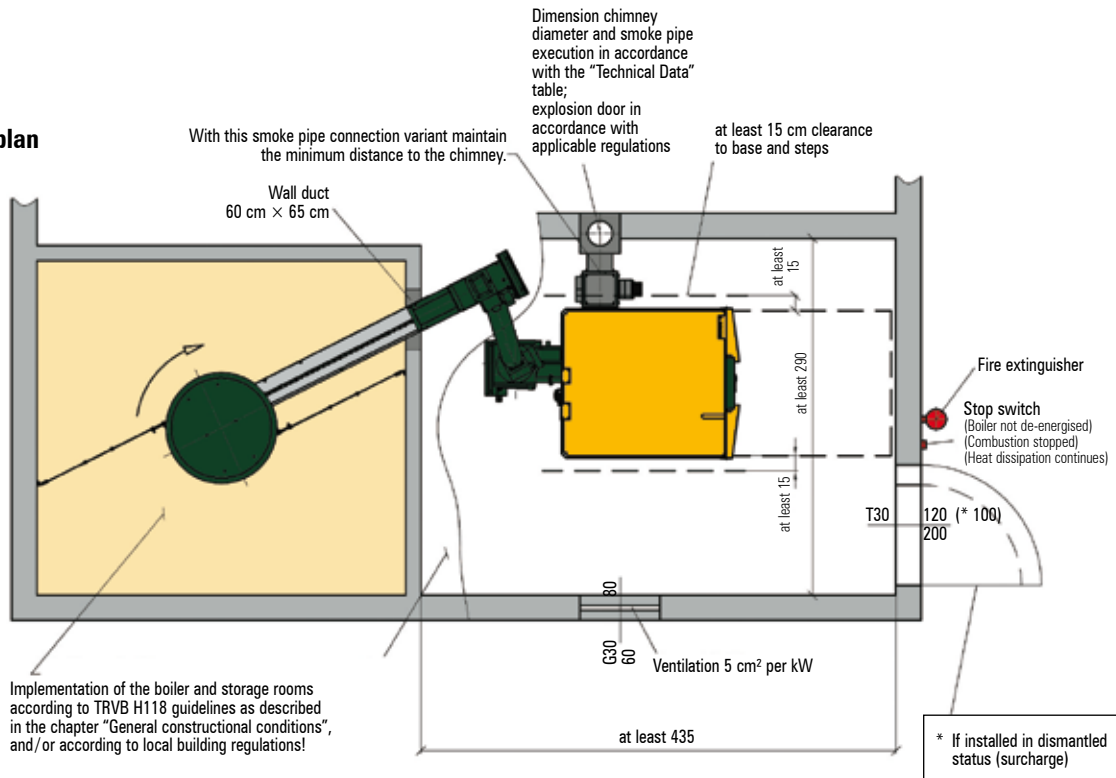
F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501  
 T30 in accordance with ÖNORM B 3800, EI,30-C in accordance with ÖNORM EN 13501  
 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501  
 All dimensions in cm

## KWB Powerfire 130–150 kW with fuel extraction from storage room located above

### Outline



### Ground plan



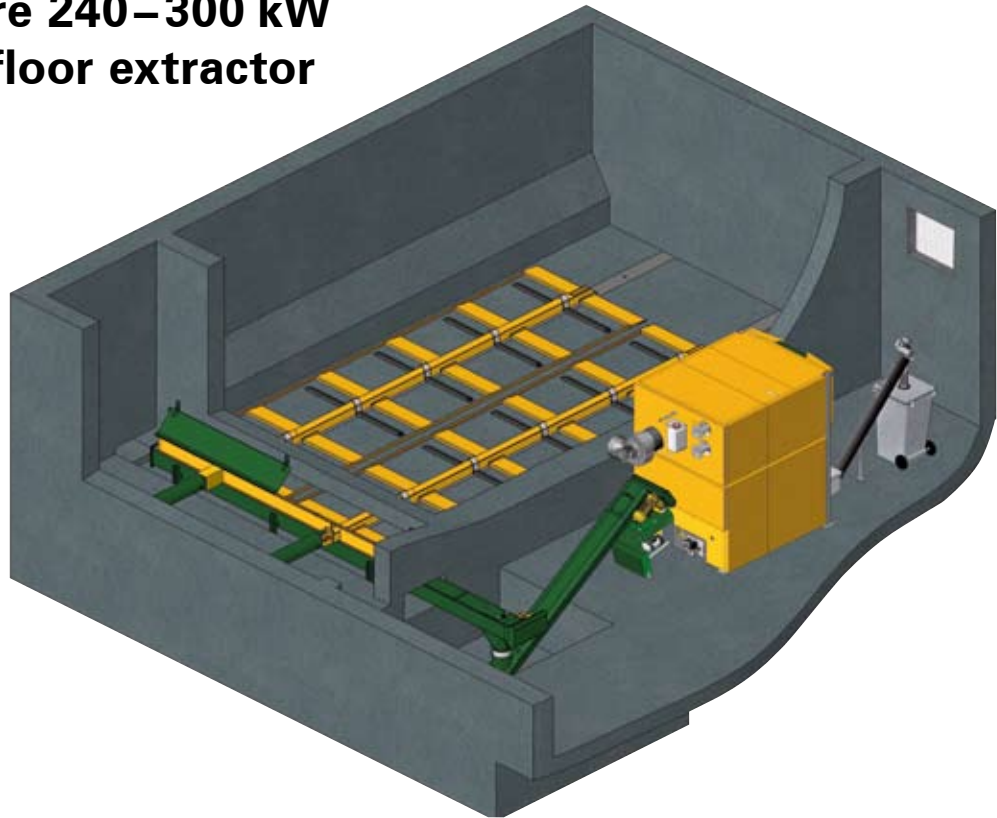
F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501  
 T30 in accordance with ÖNORM B 3800, EI<sub>2</sub>30-C in accordance with ÖNORM EN 13501  
 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501  
 All dimensions in cm

A dead floor – as shown in the installation examples – should also be provided. Advantage:  
 For large-grain wood chips (> G30 shredded material, etc.)



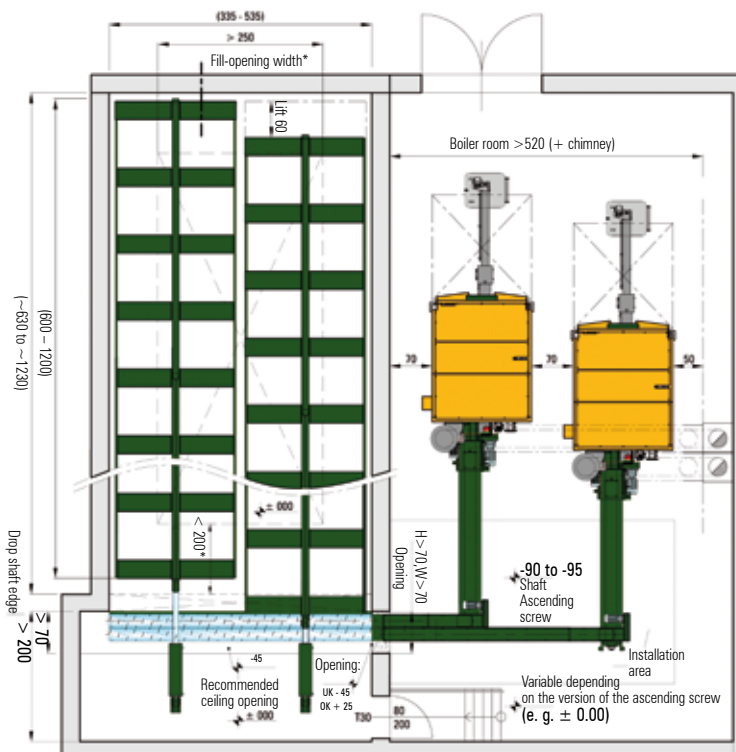


## KWB Powerfire 240–300 kW with moving floor extractor



## Dual boiler system KWB Powerfire 240–300 kW with moving floor extractor

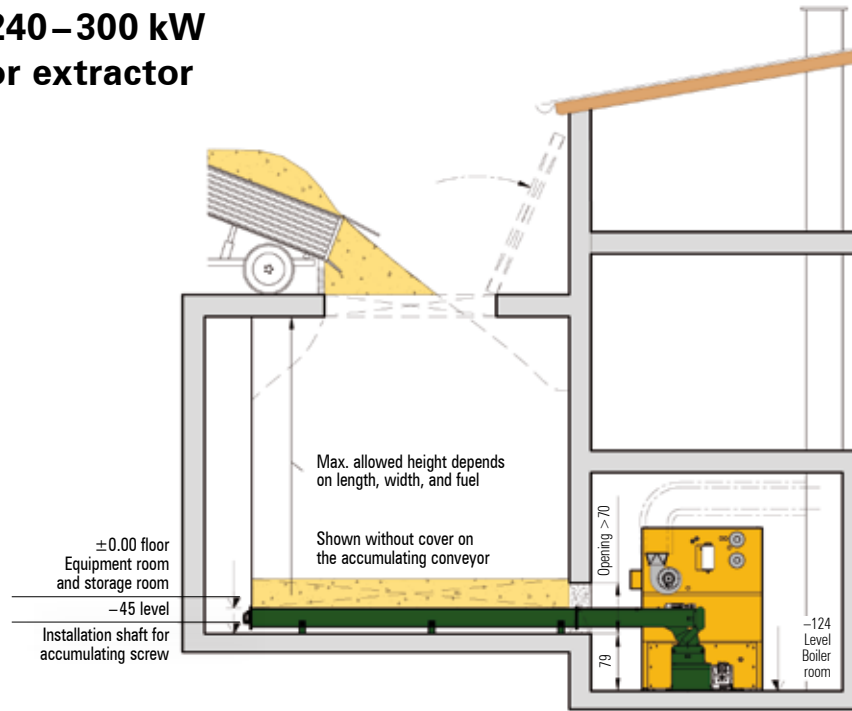
Sectional view from above



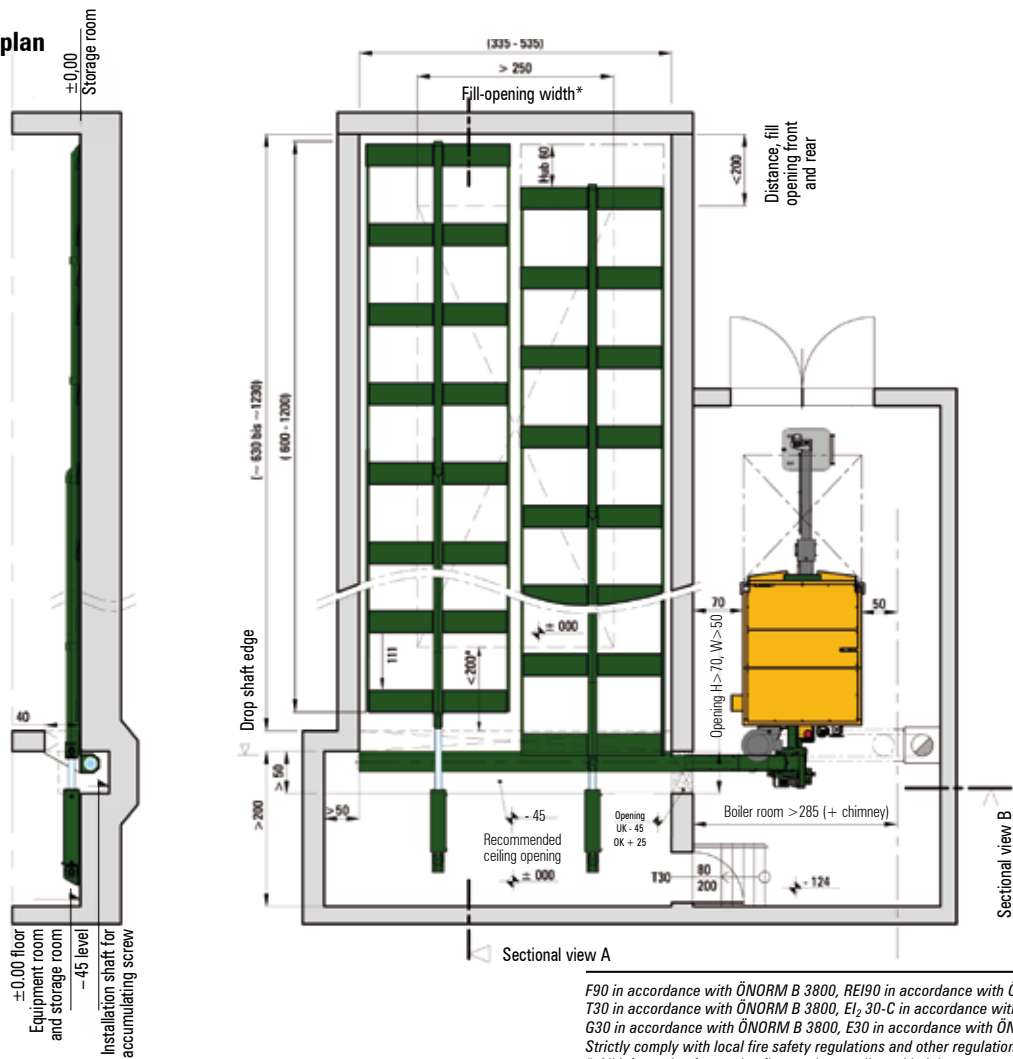
*\* All information is provided as guide values – precise custom KWB and construction planning is strictly required!  
Comply with all boiler room requirements as specified in Technology and planning!  
Comply with all local regulations (fire protection, industrial safety, escape routes, railings, coverings, etc.)*

## KWB Powerfire 240–300 kW with moving floor extractor

### Outline



### Ground plan

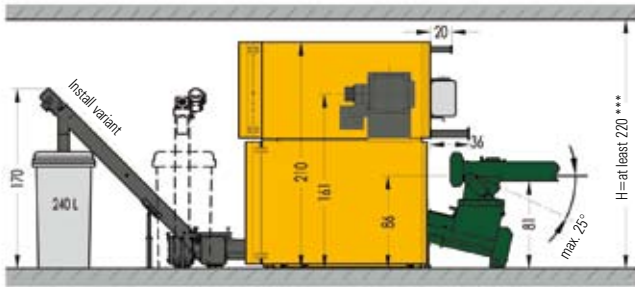


F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501  
 T30 in accordance with ÖNORM B 3800, EI<sub>2</sub> 30-C in accordance with ÖNORM EN 13501  
 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501  
 Strictly comply with local fire safety regulations and other regulations  
 \* All information for moving floor and max. allowed height are approximate values –  
 precise individual KWB planning and construction planning are strictly required.  
 All dimensions in cm

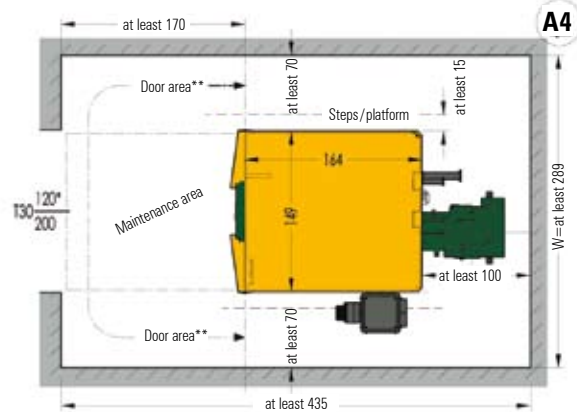
## Installation dimensions, TDS 130 and TDS 150

A minimum unobstructed door width of 1.20 m is necessary for transport into the room in a pre-assembled state. For transport in dismantled status 1 m. The door height should be 2 m. For a prompt and trouble-free installation, it is necessary to inform KWB of the clear door widths in the planning stage. Due to the weight of the ash container a lifting device is recommended for stair access to the boiler room.

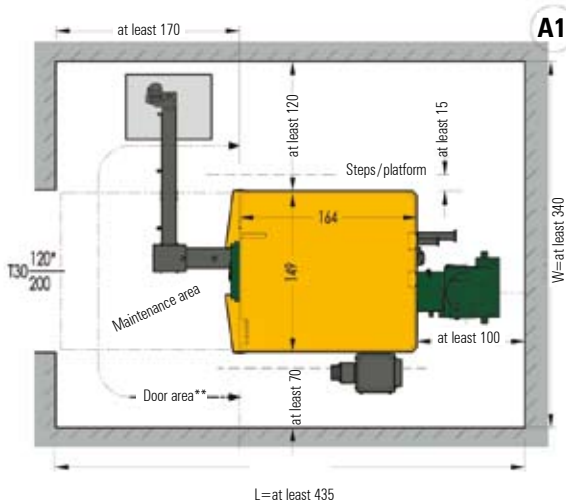
Version: View from the right



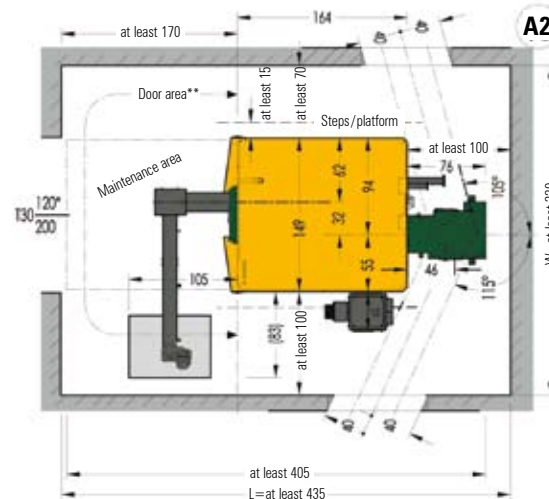
Model A4: Internal ash container



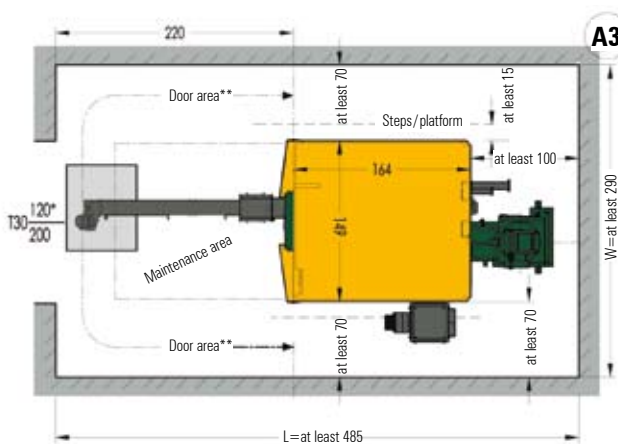
Model A1: External ash container left



Model A2: External ash container right (with swing range of the fuel extractor and wall duct)



Model A3: External ash container front



All distance specifications are minimum dimensions and only apply for the install variants shown! With regards to space requirements also pay attention to smoke pipe routing and chimney position – the space requirement for reducers and elbows can influence the minimum distances!

\* Recommended door dimensions (minimum door dimensions for system installation in dismantled status against surcharge: 1,0x2,0 m)

\*\* Door area valid for all models: The door (T30) must be in the drawn-in area – deviations require consultation with KWB!

**If the door is not directly in front of the system the space requirement increases to at least 220 cm.**

\*\*\* For room heights below 280 cm suitable lifting tools (electr. forklift, wheel front loader, etc.) must be provided by the customer.

F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501  
T30 in accordance with ÖNORM B 3800, EI<sub>2</sub> 30-C in accordance with ÖNORM EN 13501  
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501  
All dimensions in cm

Minimum room dimensions of the ash container built-in variants (cm)					
	Ash-container position				
	Left	Right	Front	Internal	Any
<b>Version:</b>	A1	A2	A3	A4	
<b>Room width (B)</b>	340	320	290	290	370
<b>Room length (L)</b>	435	435	485	435	485
<b>Room height (H)</b>	220	220	220	220	220

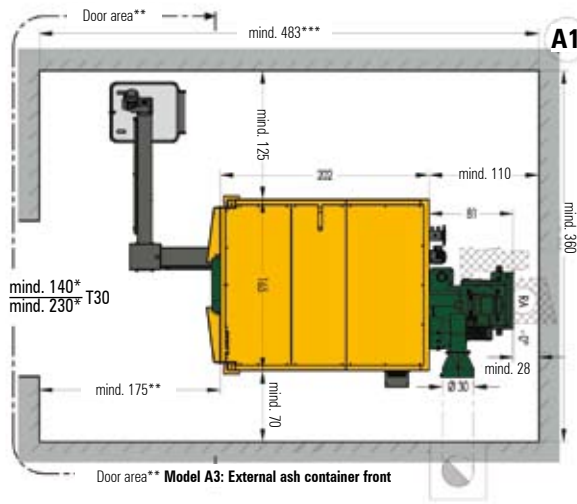


## Installation dimensions TDS 240 and TDS 300

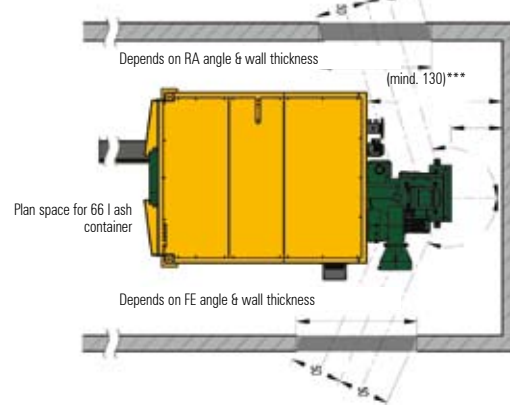
A minimum unobstructed door width of 1.40 m must be provided to bring it in. The door height must be 2 m. For a prompt and simple installation, it is necessary to inform KWB of the clear door widths at the planning stage. Due to the weight of the ash container a lifting device is recommended for stair access to the boiler room.



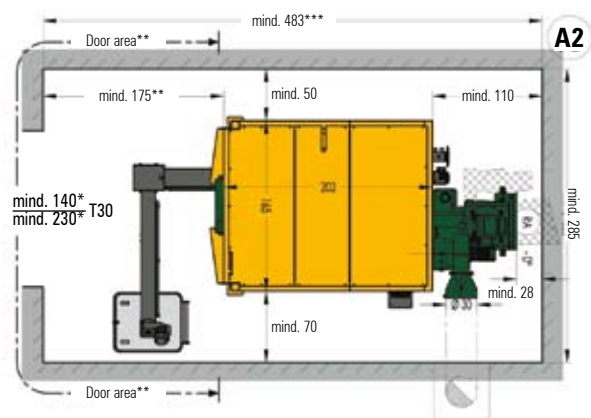
Model A1: External ash container left



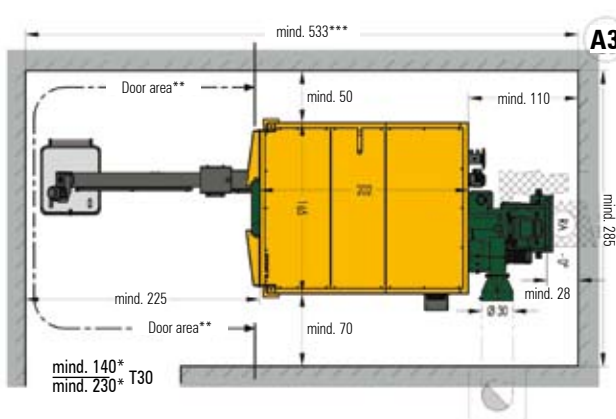
Wall penetration swing range of the fuel extractor



Model A2: External ash container right



Model A3: External ash container front



All distance specifications are minimum dimensions and only apply for the install variants shown! With regards to space requirements also pay attention to smoke pipe routing and chimney position – the space requirement for reducers and elbows can influence the minimum distances! Light feed material for ceiling opening 1.35 x 2.2 m.

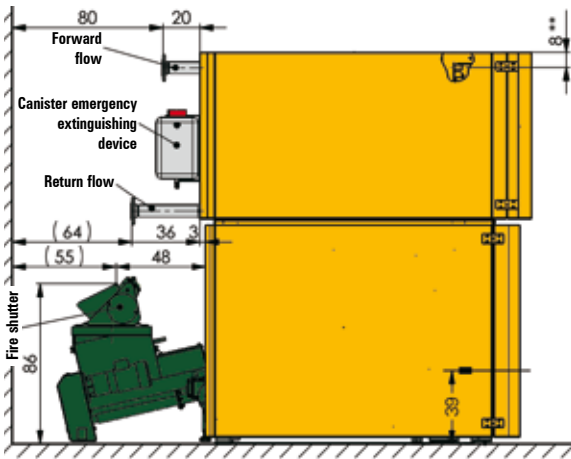
- \* Recommended door dimensions (minimum door dimensions for system installation in dismantled status against surcharge: 1,4 x 2,0 m)
- \*\* Door area valid for all models: The door (T30) must be in the drawn-in area – deviations require consultation with KWB!  
**If the door is not directly in front of the system the space requirement increases to at least 220 cm.**
- \*\*\* For room heights below 280 cm suitable lifting tools (electr. forklift, wheel front loader, etc.) must be provided by the customer.

Minimum room dimensions of the ash container built-in variants (cm)				
	Ash-container position			
	left	right	Front	Any
Version:	A1	A2	A3	
Room width (B)	360	285	285	370
Room length (L)	483	483	533	560
Room height (H)	240	240	240	240

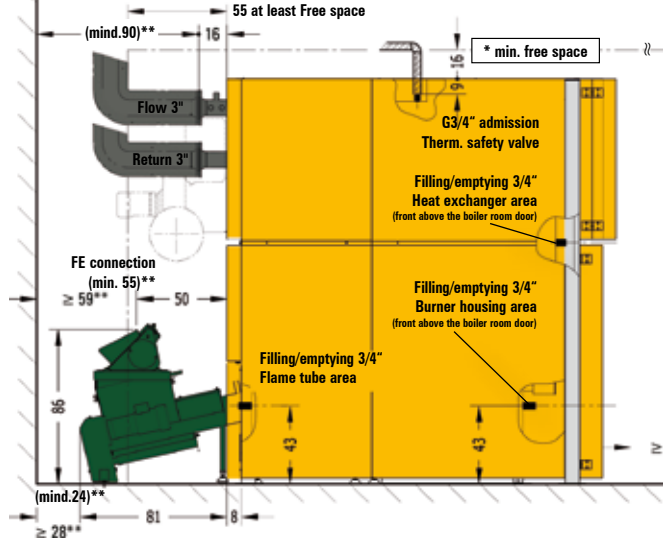
F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501  
T30 in accordance with ÖNORM B 3800, EI2 30-C in accordance with ÖNORM EN 13501  
G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501  
All dimensions in cm

# Connection dimensions

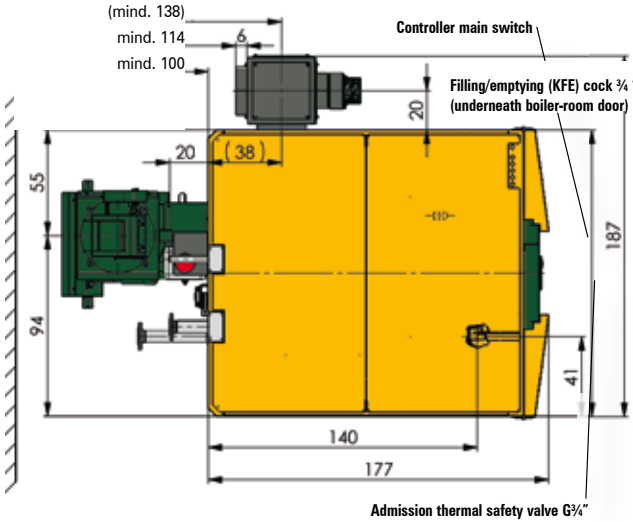
**TDS 130 and TDS 150 Side view**



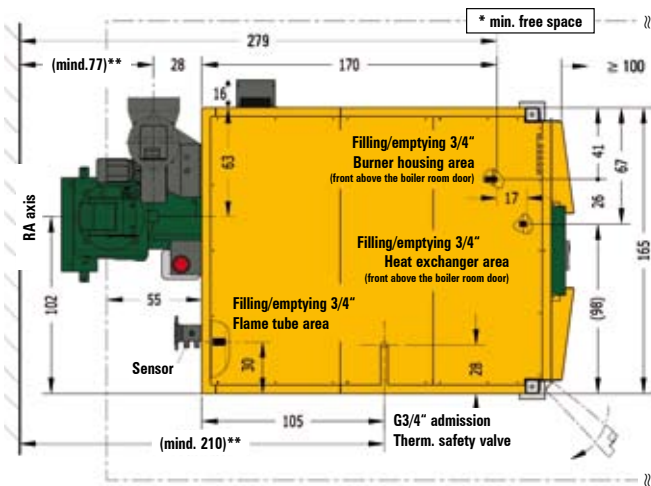
**TDS 240 and TDS 300 Side view**



**Floor plan**

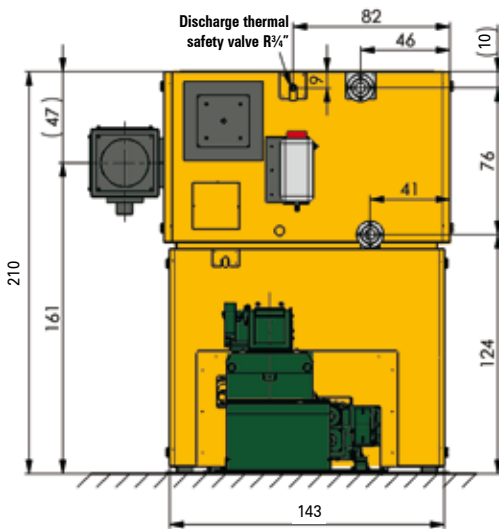


**Floor plan**

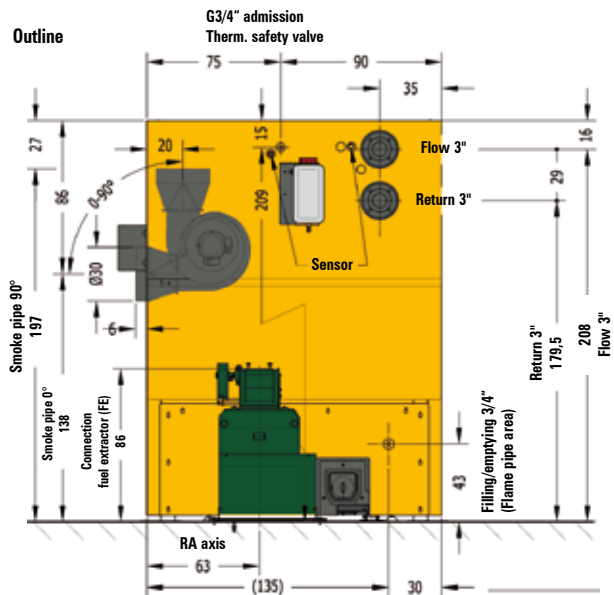


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**Outline**



**Outline**



All dimensions in cm

\* Free space: Free space: the entire cladding must remain detachable at all times

\*\* Distance valid if the fuel extractor is installed horizontally and vertically with 0°. If the fuel extractor is at an angle (-105° to +115°) and/or inclined (max. 25°) the distance to the brickwork behind the system must be increased by a minimum of 26 cm.

Designation	Unit	TDS 130		TDS 150		TDS 240		TDS 300	
		Pellets	Wood chips	Pellets	Wood chips	Pellets	Wood chips	Pellets	Wood chips
Fuel									
Rated power	kW	130.0	130.0	150.0	150.0	245.0	245.0	300.0	300.0
Partial load	kW	39.0	39.0	45.0	45.0	73.5	73.5	73.5	73.5
Boiler efficiency at rated power	%	91.9	91.0	91.5	90.4	92.7	93.2	93.5	93.3
Boiler efficiency at partial load	%	91.6	90.6	93.6	92.9	93.3	92.8	93.3	92.8
Fuel thermal output at rated power	kW	141.5	142.9	163.9	165.9	264.3	262.9	320.9	321.5
Fuel thermal output at partial load	kW	42.6	43.0	48.1	48.4	78.8	79.2	78.8	79.2
<b>Water side</b>									
Water content	l	295	295	295	295	610	610	610	610
Water-connection diameter		DN 50 (flange), PN6				DN 80 (flange), PN6			
Thermal safety valve	Inches	¾ (min. 2 bar; max. 3.5 bar)							
Water-side resistance at 20 K	Pa	2,600	2,600	2,800	2,800	2,100	2,100	3,500	3,500
Water-side resistance at 15 K	Pa	3,800	3,800	5,000	5,000	3,800	3,800	6,600	6,600
Water-side resistance at 10 K	Pa	7,800	7,800	11,200	11,200	9,600	9,600	16,100	16,100
Boiler temperature	°C	65–90	65–90	65–90	65–90	65–90	65–90	65–90	65–90
Minimum boiler inlet temperature to W30	°C	50	55	50	55	50	55	50	55
Minimum boiler inlet temperature > W30	°C	–	65	–	65	–	65	–	65
Max. operating pressure	bar	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
<b>Flue-gas side</b>									
Combustion chamber temperature	°C	900–1,200	900–1,000	900–1,200	900–1,000	900–1,200	900–1,000	900–1,200	900–1,000
Combustion chamber negative pressure	mbar	0.2–0.3	0.2–0.3	0.2–0.3	0.2–0.3	0.2–0.3	0.2–0.3	0.2–0.3	0.2–0.3
Required draft at rated power	mbar	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Required draft at partial load	mbar	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Induced draft required		yes	yes	yes	yes	yes	yes	yes	yes
Exhaust-gas temperature at rated power (for chimney calculation)	°C	160	160	160	160	160	160	160	160
Exhaust gas temperature partial load (for chimney calculation)	°C	80	80	80	80	80	80	80	80
Flue gas mass flow, rated power (RGf)	kg <sub>f</sub> /h	302	352/385	388	493/565	575	635/692	696	773/843
Flue gas mass flow, partial load (RGf)	kg <sub>f</sub> /h	91	106/116	110	137/157	172	198/216	172	198/216
Flue gas volume, rated power (RGf)	Nm <sup>3</sup> <sub>f</sub> /h	234	277/308	300	388/455	466	499/555	538	607/674
Flue gas volume, partial load (RGf)	Nm <sup>3</sup> <sub>f</sub> /h	70	83/93	87	130/180	133	155/173	133	155/173
Smoke-pipe diameter	mm	250	250	250	250	300	300	300	300
Chimney diameter (approx. values)	mm	300	300	300	300	350	350	350	350
Smoke pipe connection height (boiler side)	mm	1,615	1,615	1,615	1,615	Connection variants: up: 1,970 mm / right: 1,380 mm smoke pipe centre (0°–90° pivoting)			
Chimney design		Moisture-resistant				Moisture-resistant			
<b>Fuel</b>									
Maximum water content	kg/kgFS	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
		–	HG W30/W45 *	–	HG W30/W45 *	–	HG W30/W45 *	–	HG W30/W45 *
Maximum fuel humidity	kg/kgTS	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Maximum fuel size acc. to ÖNORM		G50	G50	G50	G50	G50	G50	G50	G50
<b>Ash</b>									
Ash-container volume – fly ash	l	23	23	23	23	2 containers each 20 l	2 containers each 20 l	2 containers each 20 l	2 containers each 20 l
Ash-container volume – grate ash	l	66	66	66	66	66	66	66	66
Ash removal system		yes	yes	yes	yes	yes	yes	yes	yes
Ash-container volume container (optional)	l	240	240	240	240	240	240	240	240
<b>Electrical system</b>									
Connection		400 V 5-pole 50 Hz				400 V 5-pole 50 Hz			
Connected power boiler	W	3,010	3,010	3,010	3,010	3,600	3,600	3,600	3,600
Connected power total incl. fuel extractor max.	W	4,510	4,510	4,510	4,510	5,100	5,100	5,100	5,100
<b>Weights</b>									
Total weight, empty	kg	1,972	1,972	1,972	1,972	2,830	2,830	2,830	2,830
Burner housing incl. chamotte	kg	874	874	874	874	834	834	834	834
Flame tube TDS 240/300 incl. chamotte	kg	–	–	–	–	970	970	970	970
Heat exchanger incl. cleaning grille	kg	668	668	668	668	860	860	860	860
<b>Noise emissions</b>									
Normal operating noise (100 % NL); LA,eq at 1 m distance	dB(A)	60 in accordance with ÖNorm EN ISO 11202:1995				63 in accordance with ÖNorm EN ISO 11202:1995			
Operating peaks (100 % NL); LA, eq at 1 m distance	dB(A)	68 in accordance with ÖNorm EN ISO 11202:1995				65 in accordance with ÖNorm EN ISO 11202:1995			

\* Provision of the rated power to W30, above this level there is a reduction in power dissipation.

## Note – general constructional conditions

Always observe the 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. 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. Without laying claim to an exhaustive treatment of the issue at hand and without suspension of any conditions imposed by the authorities, based on the Austrian directive TRVB H 118 and ÖKL technical bulletin No. 56 and No. 66, we recommend the configuration described below.

### Boiler room

Concrete flooring, plain or tiled; height-adjustable boiler feet or shims can be used to compensate minor irregularities. All materials for floors, walls, ceilings to be fire resistant F90\*1; boiler room door (see table of clear door widths) 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 G303; non-closing intake air opening 5 cm<sup>2</sup> per kW rated power of heating system, but not less than 750 cm<sup>2</sup>. It is necessary to integrate one ventilation opening near the floor and another ventilation opening near the ceiling; 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 into the open. Permanently installed lighting and electrical supply to the heating system; light and labelled emergency-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 (6 kg filling weight, EN3 standard) 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 inflammable materials in the boiler room outside the boiler system, storage container or hopper; no direct connection to rooms where inflammable gases or liquids (garage) are stored. See the installation examples for the minimum clear door widths.

Comply with the installation guidelines.

### Fuel storage room

The constructional on-site requirements for the boiler room also apply to the fuel storage room. The stirrer is installed in the middle of the storage room and is fastened to the concrete floor with anchor bolts. A rear-ventilated blind floor/inclined floor should be installed at the same level as the top edge of the fuel extractor. The wall duct for the screw trough between storage room and boiler room must be sealed so that it is fire-proof (e. g. with rock wool). If a pumping car is used to fill the fuel storage room with wood chips or pellets, it is necessary to mount hose couplings and pipelines (to be earthed). These are available from KWB. If this filling method is chosen, dustproof sealing of the fuel storage room is required. The escaping air is removed through a second earthed pipeline and hose coupling, or it is blown off into the open air after having passed through a filtering section. Suction removal or filtration of the transport air is the responsibility of the fuel supplier. The walls, windows and doors must withstand the overpressure created during the filling process. No electrical installations are permissible in the fuel storage room since they pose a risk of ignition. KWB biomass boilers are supplied with all the necessary fire-protection equipment included. Depending on the local installation situation, type of fuel and amount of storage, a manually triggered fire extinguisher and/or the built-in fire extinguisher may have to be connected to a pressurised water line. The fire extinguisher with manual release featuring a frost-proof connection (from the boiler room) is to be fitted at least ¾" or as DN 20 directly above the conduit of the fuel-extractor trough leading into the fuel storage room as empty piping. The shut-off device which is to be installed in the boiler room must be marked with the following sign: "Fire extinguisher – fuel storage room". A fire extinguisher must be installed in storage systems containing 50 to 200 m<sup>3</sup> of wood chips for systems up to and including 400 kW. If such a fuel-storage room is built onto fire-resistant parts without openings, it is not necessary to enclose it with F90\*1 sheathing/execution. In the case of wood-chip storage rooms in utility outbuildings with a fire wall facing the living quarters, an F90\*1 execution/sheathing of the fuel-storage room is not necessary if as the fire section is smaller than 500 <sup>2</sup>. The fuel must be stored separately from other goods (e. g. by wooden planking). A manual-release extinguisher and an integrated extinguishing system must be installed. When storing up to and including 200 m<sup>3</sup> of other wood materials (with dust) in systems up to and including 400 kW, an integrated extinguisher must be installed in addition to a manual-release extinguisher. For systems greater than 400 kW or stored quantities greater than 200 m<sup>2</sup>m<sup>2</sup>, both (a manual-release extinguisher and an integrated extinguisher) are necessary (see TRVB H118). For storage rooms and silos that are continuously charged with chips or sawdust via suction, a sealing cellular wheel sluice (or equivalent device) must be installed in the drop shaft. Additional statutory safety and acceptance regulations apply. If you have any questions, please contact your KWB factory representative. Above-ground fuel stores must be accessible to the outside by means of a door with at least a 1.80 m cross-section, and must be planked to prevent the fuel from pouring out should the door

\*1 F90 in accordance with ÖNORM B 3800, REI90 in accordance with ÖNORM EN 13501

\*2 T30 in accordance with ÖNORM B 3800, EI<sub>2</sub> 30-C in accordance with ÖNORM EN 13501

\*3 G30 in accordance with ÖNORM B 3800, E30 in accordance with ÖNORM EN 13501



be opened by mistake. The planking should be removable from the outside. An inspection opening (F90\*1) must be installed above the fuel extractor trough. Please refer to the installation examples.

## Chimney

Due to the high boiler efficiency, the chimney design should be resistant to moisture. 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 (see DIN 13384)! The standard 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 1.50 m, 2 segment bends at 90° each, 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.

## Installation of the boiler

### Boiler set up

To be performed exclusively by qualified, trained personnel of KWB or KWB associates. The boiler system is assembled and installed ready to plug in, site conditions permitting, otherwise it is dismantled before installation and then assembled ready to plug in, in the boiler room. Due to the not inconsiderable weight of the boiler, we recommend preparing the transport path, e. g. place boards or panels on tiled floors. Ensure that the route is level and the substrates are stable. Licensed heating and electrical fitters must connect the boiler system to the chimney, water and electrical system; this must be verified for numerous reasons, e. g. in order to be eligible for subsidies.

## Smoke pipe connection and induced draft fan

As a general rule, the dimensions of the smoke-pipe connection between boiler and chimney should be identical to the connection on the boiler. The chimney connection must be at least as high as the smoke-pipe connection on the boiler. Keep the smoke pipe as short as possible. The smoke pipe must be insulated and should be routed upward toward the chimney, at an angle of less than 45°, preferably with an inclination of less than 3 %, and connected. A draft limiter and a detonation damper are to be built into the smoke pipe or chimney side wall and arranged in such a way as to exclude any danger to persons. The smoke pipe should be thermally insulated and feature suitable, easily-accessible cleaning openings. The chimney connection should be 20 mm larger than the smoke-pipe diameter. In this way, it is possible to integrate a suitable acoustic transmission decoupler between the smoke pipe and the chimney. The KWB system is equipped with a negative-pressure controlled induced-draft fan as standard.

## Hydraulic integration

It is necessary to have a return flow inlet temperature of at least 55°C, otherwise there is danger of corrosion and thus loss of guarantee. A mixer controller for return flow boost is activated from the boiler control. Suitable fittings to increase the return flow temperature are available from KWB. The heating system must be equipped with a pressureless distribution system (switch, distributor, load-balancing tank, buffer tank). To dissipate excess heat a thermal safety valve is installed that must be integrated in accordance with the diagram. Moreover the safety devices prescribed for closed hot water heating systems (in accordance with ÖNORM EN 12828 or ONÖRM EN 303) must be installed by the party installing the hydraulic system.

With respect to the condition of the boiler water, VDI 2035 or ÖNORM H 5195 T1 and T2 must be unconditionally adhered to, otherwise there is a risk of corrosion, which may void the warranty.

A sufficiently dimensioned buffer tank is required if the continuous heating capacity requirement does not constantly exceed minimum boiler capacity (see technical data), and consistent capacity operation of at least 60 minutes (e.g. summer

Boiler pumps – parameters		Control valve or return-flow mixer
Boiler power [kW]	at least Ø forward flow, return flow	Kvs [m³/h]
130	DN50	44
150	DN50	44
240	DN80	63
300	DN80	63



operation, transition time) cannot be maintained. Likewise for dual biomass boiler systems or integration of a log wood boiler. To prevent the safety devices that protect against overheating from tripping when switching off all heat consumers, either a phased consumer switch-off must occur, or you must ensure sufficient afterrun of consumer circuits with sufficient load. Also in cases of solar integration a buffer tank may be required depending on the system concept. Special consulting with your installer/heating engineer, or planner is required!

## Electrical connections of the KWB Powerfire system

### KWB Comfort 3

#### Scope of delivery includes:

- 2 heating system master boards
- Boiler control unit
- Sensor set  
(1 x DHWC sensor, 2 x buffer tank sensor, and 1 x return flow temperature sensor)\*

#### Optional:

- Heating circuit expansion module with sensor set  
(2 x forward flow sensor, 1x DHWC sensor, 2 x buffer tank sensor, and 1 x outdoor temperature sensor)\*
- Analogue and digital room control units with room temperature sensor
- Fuel extractor module for activating a second fuel extractor motor

#### The following devices can be connected:

- **Order option: No heating circuit**
  - 1 boiler circuit pump\*\*
  - 1 DHWC pump\*\*
  - 1 return-flow mixer\*\*\*
- **Order option: Heating circuit expansion module**
  - 1 supply pump\*\*
  - 1 DHWC pump\*\*
  - 2 heating-circuit pumps\*\*
  - 2 heating circuit mixers\*\*\*

#### Outputs:

Floating contacts

with max. 2 A switched current, 230 V AC

- **Fault warning output**  
Combined fault warning contact (e.g. for remote warning through telephone dialling)
  - Fault 1: NC contact to indicate faults
  - Fault 2: NO contact to indicate faults
- **Power** (the following options are also possible as alternatives):  
NO, configurable for
  - Burner operation display (modulation between partial load and nominal load)

Connection to the mains supply is executed via the main switch of the boiler and must be installed according to regulations (according to EN 602041 Electrical installation of machinery – general requirements). Mains connection: Three-phase connection with neutral conductor (Overcurrent protection devices are mandatory, but, however not the type. Type C is the minimum requirement for a domestic connection.). Required connections to be provided by customer: European socket, 5 pin/16 A; type C lightning arrester at the distribution board of the house (recommended as lightning protection), magnetic-field detection relay with emergency power supply and emergency-stop escape switch. Potential equalisation is recommended. If using KWB Comfort SMS: Socket 230 V AC.

- Boiler master-and-slave circuit to request a second boiler
- Fuel extractor for common stirrer drive
- **Smoke extractor**
  - NO contact for activating an external smoke extractor
  - The boiler is released by the controller of the external smoke extractor via external 1 (floating contact).

#### Inputs:

24 V DC supply to connect floating contacts.

- **External 1:**
  - To switch on the boiler. This is where the danger switch, the “stop switch” is connected. If this input is not used, it must be short-circuited.
- **External 2: Multifunction input**
  - Heating to desired 2: To request the boiler with the second boiler temperature desired temperature or as a request contact for external third-party control systems. With a separate control system, a sufficiently large buffer tank must be available in the boiler circuit or the afterrun time of a heating circuit (configured by means of separate control) must be guaranteed for at least 60 minutes by means of this separate control system.
  - Holiday remote control: For holiday remote control (does not work with external boiler request).

\* DHWC and buffer tank sensor are pin sensors Ø 6 mm, outdoor temperature sensor with housing, all other sensors are clip-on temperature sensors

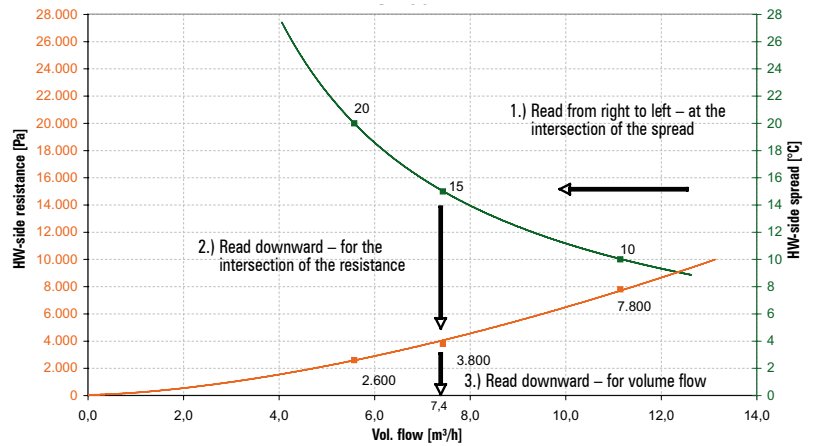
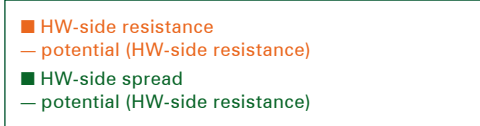
\*\* Pump connection: 230 V AC, max. 200 W, speed-controlled output for boiler circuit pump (suitable for speed control of fixed-speed pumps).

If using three-phase boiler-circuit pumps 3 × 400 V, a motor protection system should be installed; the auxiliary coil of this protection system must have a power requirement of ≥ 3 W.

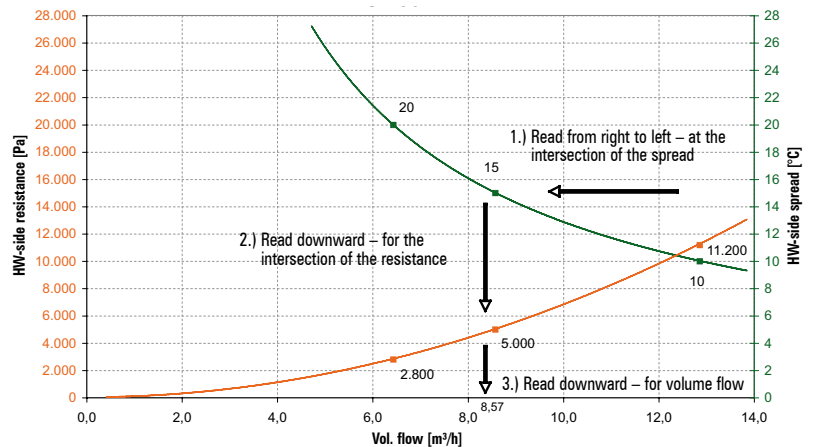
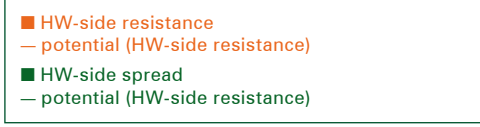
No speed regulation or adjustment is possible. Mixing circuit only permissible for return-flow boost

\*\*\* Mixer motor connection: 230 V AC, open/off/closed (three-step)

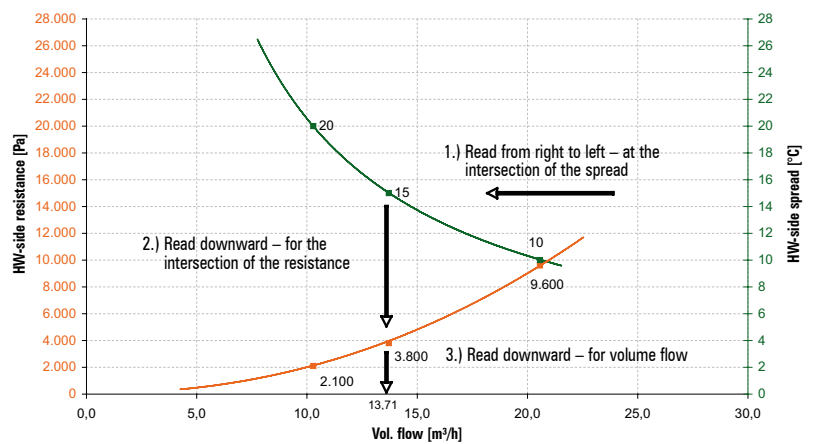
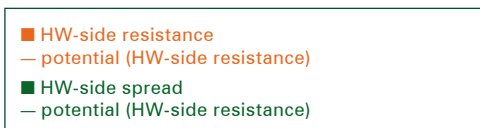
## Water-side resistance KWB Powerfire TDS 130



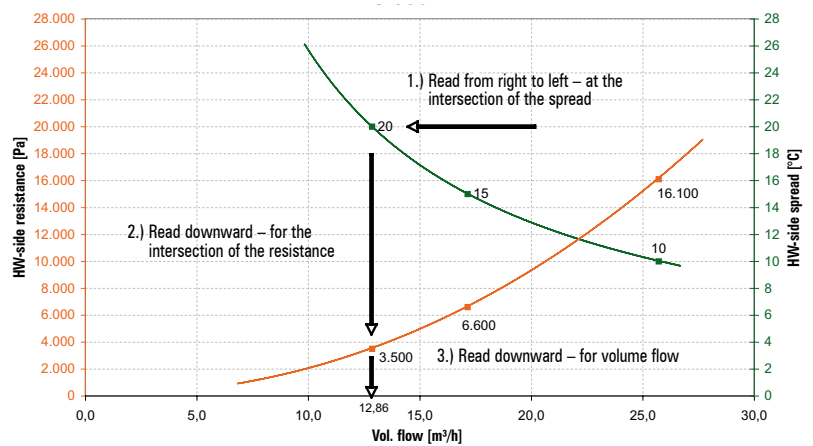
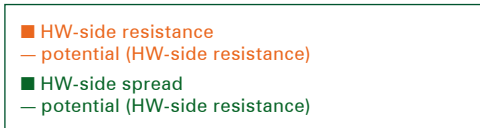
## Water-side resistance KWB Powerfire TDS 150



## Water-side resistance KWB Powerfire TDS 240



## Water-side resistance KWB Powerfire TDS 300



■ HW = hot water

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