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# Wood chip & Pellet heating systems 240/300 kW

Technology & Planning 2024



# KWB Powerfire type TDS

## Wood chip and pellet heating system 240/300 kW

### KWB heat exchanger:

- Self-cleaning revolving grate system (fuel transport occurs via the rotation of the grate)
- Stoker screw with stainless steel spirals incl. drive unit (equipped with a spiral progressively increasing in size to prevent congestion)
- Backfire protector (gas-tight and automatically closing fire shutter) and thermally acting backfire safeguard (emergency fire extinguisher)
- Primary combustion air supply via speed-regulated fans below the revolving ring grate via a special air-distribution system which allows for a progressive, staged air supply including a control for the combustion speed at the grate.
- Suitable for the combustion of wood chips categories P16S and P31S with a moisture content of up to 45% in accordance with ISO 17225-4 as well as wood pellets of quality categories A1 and A2 in accordance with ISO 17225-2.

**KWB ash removal system:** specially developed grate cleaning system and dropping of the ash onto an extraction screw situated under the grate, which extracts the ash and takes it to the integrated 66 l ash container or, optionally, to an 120 l / 240 l ash bin.

- Vertically standing cyclone combustion chamber as post-combustion unit
- Secondary air supply occurs through speed-regulated fans via specially developed and optimised secondary air nozzles.
- KWB heat exchanger: upright tubular heat exchanger with fully automatic heat exchanger cleaning, consisting of screw turbulators
- The underbody in the area of the burner system is cooled with water, the cover of the heat exchanger is insulated in the KWB Powerfire as a result of which the radiation loss is reduced considerably. Thanks to the all-around insulation the radiation loss is further minimised.

**KWB Comfort 3 control comprising:** Control unit incl. buffer storage tank and domestic hot water management, expandable with external heating circuit control (on a C4 basis)

### Connection of the KWB Powerfire to a Comfort 4 heating management network:

The KWB Powerfire is linked to the Comfort 4 heating management module autonomous through a Modbus connection. The Comfort 4 heating management module controls the entire heat distribution and storage and requests the Powerfire boiler in a performance-modulating manner. The Comfort 3 control of the boiler controls the entire combustion, return flow temperature boost and the boiler circuit pump.

### Optionally available as an extra-charge item:

Grate ash extraction in 120 l or 240 l ash bin, exhaust gas recirculation (mandatory for fuels with a moisture content < 20%), cellular wheel sluices with long-pieced fuel, external E-Filter, heat exchanger ash removal in a convenient design, forward flow temperature 95°

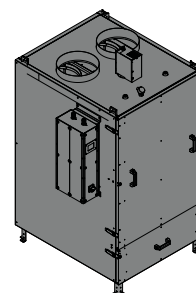
## KWB dust filter E<sup>Plus</sup> with automatic cleaning

If required, an external dust filter can be implemented. It is suitable for wood-chip and pellet heating systems and designed for the required boiler type (for wood chips with up to 35% moisture content). It is based on an electrostatic filter principle with separation efficiencies of up to 90%. Boiler and filter control communicate within the meaning of an operationally safe, fully automatic cleaning. The cleaning and ash tray emptying occurs from the front.

**Optionally available:** Double shutter bypass, automatic ash removal from the filter



**CLEAN 2.0**  
EFFICIENCY



## Wood chip operation for KWB Powerfire

### Wood chips of quality category A1 according to EN ISO 17225-4

The statutory dust emission limit values for Germany pursuant to the 1st BImSchV Level 2, and the national dust emission values of the Swiss LRV are met without additional technical measures.

### Wood chips of quality categories A2 and B1 according to EN ISO 17225-4

In order to comply with the 1st BImSchV Level 2 in Germany and to meet Swiss cantonal requirements and depending on the aerosol-forming ash content, additional technical measures may be necessary in order to comply with statutory dust emission limit values. In such a case, it will be necessary to coordinate with KWB.

## KWB's modular and easily transportable system

The KWB Powerfire wood chip & pellet heating system can be dismantled into several modules, which allows it to be placed in the heating room and also to be easily installed even in tight spaces.



# Conveyor system L

## Floor-level stirrer



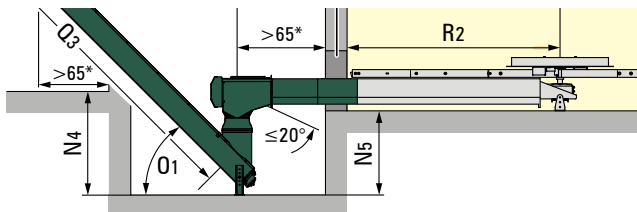
Can be realized for

wood chip and pellet operation

Compatible with

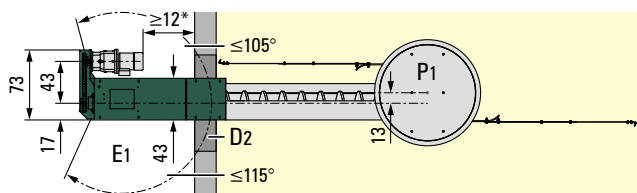
KWB Powerfire type TDS 240/300 kW

### Drawing

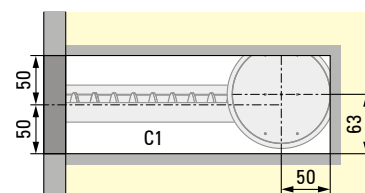


Plan the depression very carefully and ensure precise execution during construction! Deviating natural dimensions and planning errors can cause massive problems and additional costs when installing the fuel extractor!

### Plan view

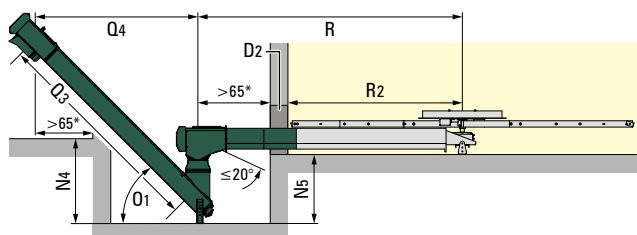


Cutouts for the floor  
(if the conveyor is installed in the floor.)

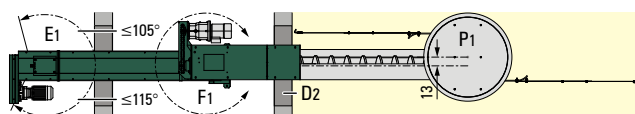


## Ascending screw with downward transfer for 240/300 kW

### Drawing



### Plan view



\* Plan an additional  $\geq 25$  cm distance to the rear wall if the fuel extractor will be installed diagonally (NOT flush with the system)! You should also include a sufficient number of openings and free spaces in the walls and ceilings – otherwise it will not be possible to move the system into the room, to install and maintain it!

### Legend

<b>C1</b>	It must be possible to dismantle the sloping or false floor for up to 30 cm around the channel!
<b>D2</b>	Wall duct 100 x 80 cm: Seal after installation and acoustically decouple channel
<b>E1</b>	Pivot range (connection to the fire shutter)
<b>F1</b>	Free rotation
<b>N3</b>	Trough depth: $\geq 93$ cm
<b>N4</b>	0°: $\leq 82$ cm, 40°: $\leq 720$ cm
<b>N5</b>	Trough depth: 87 cm (depending on the incline)
<b>O1</b>	Incline: 0°–40° Diameter of the stirrer cover plate: Spring-blade rotary stirrer: $\varnothing 85$ cm, articulated rotary blade stirrer: $\varnothing 110$ cm.
<b>P1</b>	Diameter of the stirrer: Spring-blade rotary stirrer: $\varnothing 2,5$ m, 3,0 m, 3,5 m, 4,0 m (4,5 m only for pellets), articulated rotary blade stirrer: $\varnothing 4,0$ m, 4,5 m, 5,0 m, 5,5 m

	Screw length (from the connection point: head section drop shaft to fire shutter): 0°–20°: 0–8 m (0,4 kW motor) 20°–40°: 0–5 m (0,4 kW motor) <b>Q3</b> 0°–20°: 8–12 m (1,1 kW motor) 20°–40°: 5– $\leq 12$ m (1,1 kW motor)  Limitation: You must use the same motor for the conveyor screw and ascending screw! Use 1,1 kW motor protection control (Art. no. 13-1000655) for the 1,1 kW motor!
<b>Q4</b>	$\leq 949$ cm (for screw length 12 m, 40°)
<b>R</b>	Screw length: 0–6 m (0,4 kW motor) 6– $\leq 10$ m (1,1 kW motor)
<b>R2</b>	Screw length open



### Fuel pouring heights

For the use of the spring-blade rotary stirrer or articulated rotary blade stirrer, the maximum pouring height for pellet operation is 3 m. The pouring height for wood chip operation is a stirrer diameter of 1,5. Greater pouring heights only upon request! Please comply with the EN ISO 20023 standard when designing the pellet storage.

# Conveyor system M

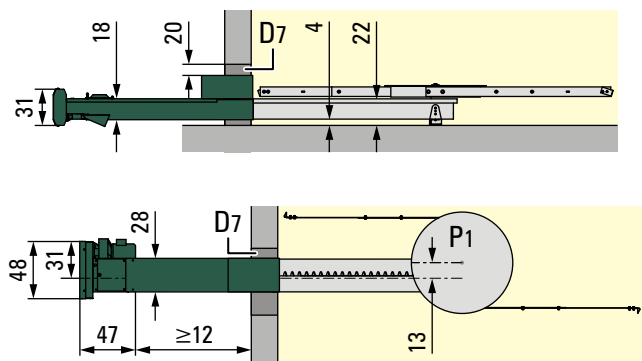
## Floor-level stirrer

The floor-level stirrer is available in two different designs depending on requirements: As a spring-blade rotary stirrer (stirrer diameter: from 2,5 to 4,0 m) and as articulated rotary-blade stirrer (from 4,0 to 5,5 m stirrer diameter).



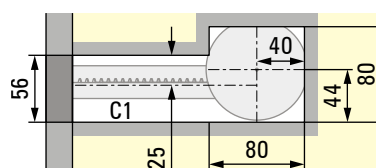
Can be realized for  
wood chip and pellet operation

## Standard channel

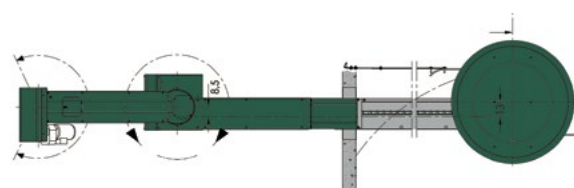
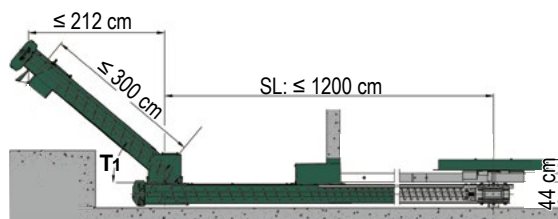


Compatible with  
KWB Multifire type MF2 20-120 kW  
KWB Pelletfire<sup>Plus</sup> type MF2 45-135 kW  
KWB Powerfire type TDS 150-300 kW

Cutouts for the floor  
(if the conveyor is installed in the floor.)

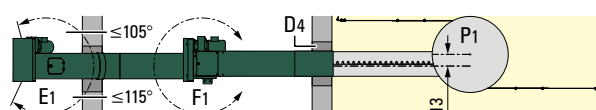
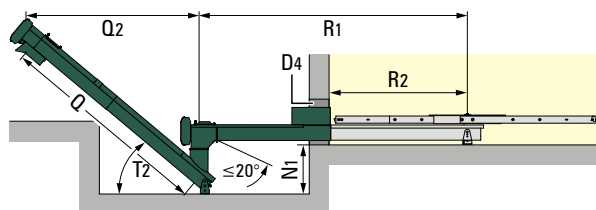


Ascending screw with upward transfer wood chips: up to 100 kW boiler output possible; pellets: up to 300 kW boiler output possible



Connection max. angle 220°  
Pivoting 360°  
Spring-blade rotary stirrer - Ø 85  
Articulated rotary blade stirrer - Ø 110

Ascending screw with downward transfer



Combine suction conveyor only with spring-blade rotary stirrer!

## Legend

D4	Wall duct 60 x 60 cm: Seal after installation; the channel must be acoustically decoupled (Ø2 cm acoustic insulation)
N1	Height difference: 0°-25°: ≥ 45 cm, 26°-35°: ≥ 50 cm, 36°-45°: ≥ 60 cm
SL	Screw length conveyor channel maximally 12 m (install horizontally!)
T1	Angle when pellets are used 35°-45°
T2	Angle when pellets are used: 0°-40° (45° with channel insert)
P1	Diameter of the stirrer cover plate: Spring-blade rotary stirrer: Ø 85 cm, articulated rotary blade stirrer: Ø 110 cm. Diameter of the stirrer: Spring-blade rotary stirrer: Ø 2,5 m, 3,0 m, 3,5 m, 4,0 m (4,5 m only for pellets), articulated rotary blade stirrer: Ø 4,0 m, 4,5 m, 5,0 m, 5,5 m

E1	Swing range ascending screw; max. angle to the KWB Multifire 220°
F1	Free rotation
Q	Screw length (from connection point head section drop shaft to the fire shutter): Up to 15°: ≤ 12 m; 15°-40°: (45° with channel insert): ≤ 6 m
Q2	45°: ≤ 4,39 m, 15°: ≤ 11,60 m
R1	Screw length: Up to 15°: ≤ 12 m; 15°-25°: ≤ 6 m
R2	Screw length open



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# Technology & Planning

Wood chip & Pellet heating systems 240/300 kW

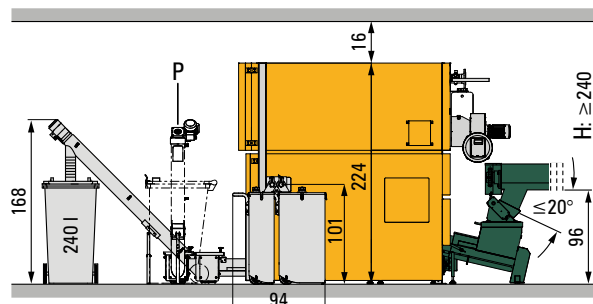


# KWB Powerfire 240 / 300 kW

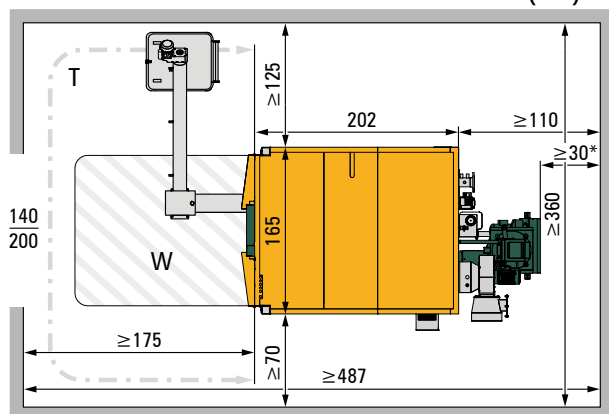
## Installation dimensions

A minimum unobstructed door width of 1,40 m must be provided to be able to move the system into the room. The unobstructed door height must be 2 m. The unobstructed dimensions for the system to fit in case of a ceiling duct are 1,40 x 2,20 m. For a prompt and smooth installation, it is necessary to notify KWB of the unobstructed door widths in the planning stage. Due to the weight of the ash container, we recommend a lifting device for stair access to the boiler room.

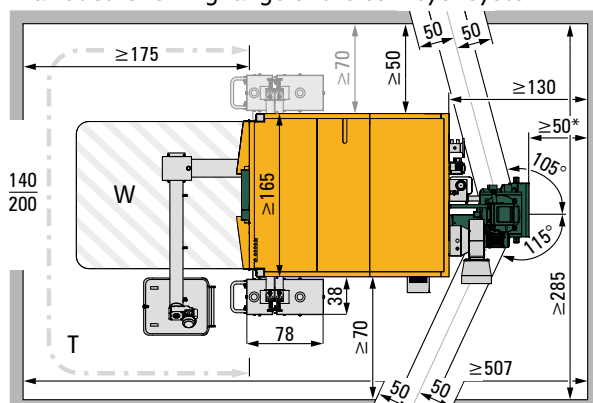
External ash container 240 l on the right and heat exchanger ash removal in a convenient design (A3)



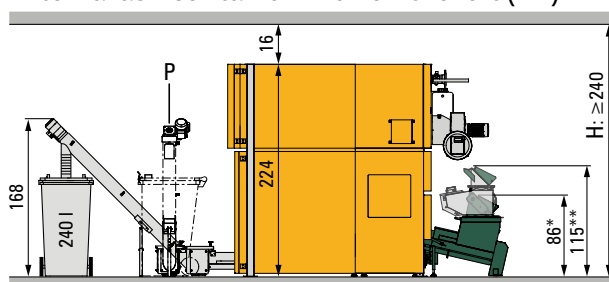
External ash container 240 l on the left (A1)



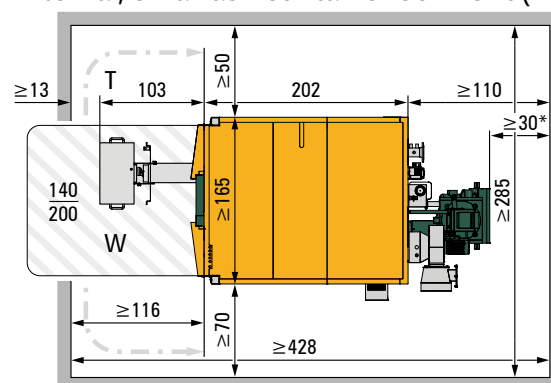
Wall duct for swing range of the conveyor system



External ash container 240 l on the left (A2)



External, small ash container 66 l front (A4)



## Legend

H	Room height: For room heights below 280 cm, the customer must provide suitable lifting tools (electrical forklift, wheel front loader, etc.).
P	Alternative position
T	Door area: Valid for all models. The door 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 in front of the system increases to at least 225 cm.
W	Maintenance area

## Minimum room dimensions

Minimum room dimensions of the built-in ash container variants (cm)					
	Ash-container position				
	left	front	right	front (66 l)	any
Version:	A1	A2	A3	A4	
Room width (B)	360	285	285	285	370
Room length (L)	487	537	507	428	560
Room height (H)	240	240	240	240	240

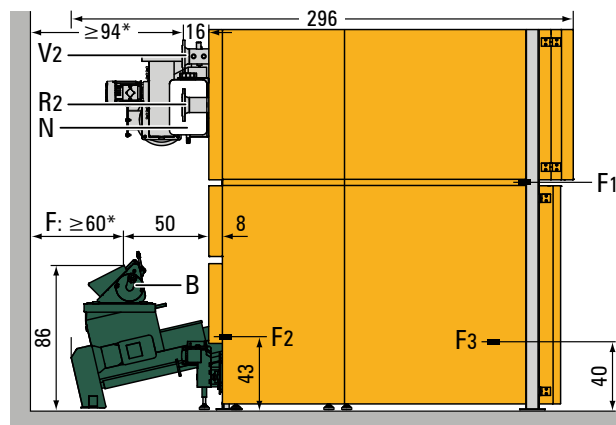
\* If the conveyor system is installed inclined (swing range: -105° to +115°), additional clearance of ≥ 20 cm to the rear wall must be planned! You must also take the gear unit and motor positions into account.

REI90 according to ÖNORM EN 13501, EI2 30-C according to ÖNORM EN 13501, E30 according to ÖNORM EN 13501

All distances stated are minimum dimensions and apply only to the installation variants shown! With regard to space requirements, please also note the exhaust gas pipe routing and chimney position – the space requirements for reducers and elbows may influence the minimum distances! It must be possible to dismantle the entire casing at any time.

## Connecting dimensions

Side view

[illegible]

<b>A</b>	Outlet for thermal safety valve ¾" (female thread)
<b>B</b>	Fire shutter
<b>B1</b>	Cellular wheel sluice (alternative to the fire shutter)
<b>C</b>	Conveyor system axle
<b>EF</b>	E-Filter
<b>F</b>	Conveyor system connection
<b>F1</b>	Boiler emptying point ¾" (female thread) - area of heat exchanger (front over the burner chamber door)
<b>F2</b>	Boiler emptying point ¾" (female thread) - flame pipe area

<b>F3</b>	Boiler filling and emptying point ¾" (female thread) – area of the burner housing (in front under the combustion chamber door)
<b>N</b>	Emergency fire-extinguishing equipment
<b>O</b>	Exhaust gas pipe
<b>R2</b>	Return flow DN 80, PN 6
<b>S</b>	Sensor for safety boiler temperature limit
<b>V</b>	Forward flow temperature sensor
<b>V2</b>	Forward flow DN 80, PN 6
<b>Z</b>	Inlet for thermal safety valve ¾" (female thread)

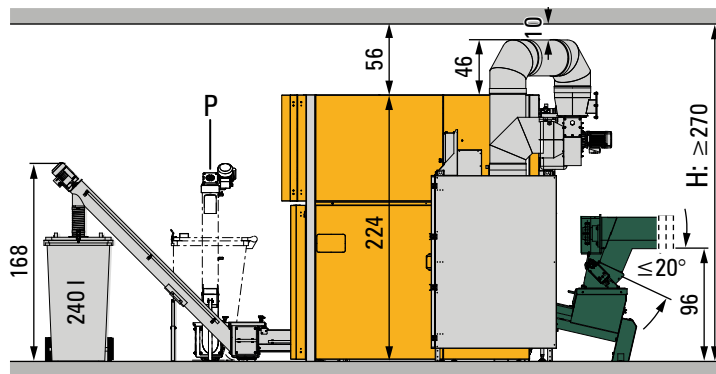
All illustrations are shown without the external ash removal system. All distances stated are minimum dimensions and apply only to the installation variants shown! With regard to space requirements, please also note the exhaust gas pipe routing and chimney position – the space requirements for reducers and elbows may influence the minimum distances! It must be possible to dismantle the entire casing at any time.

F | 7

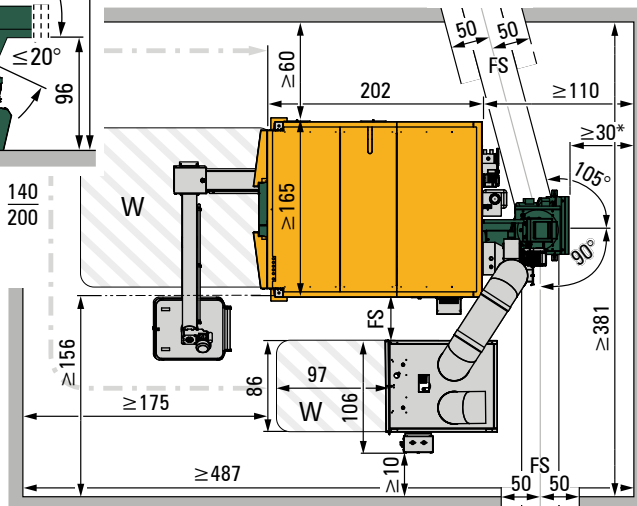


# KWB Powerfire 240 / 300 kW with KWB dust filter E<sup>Plus</sup>

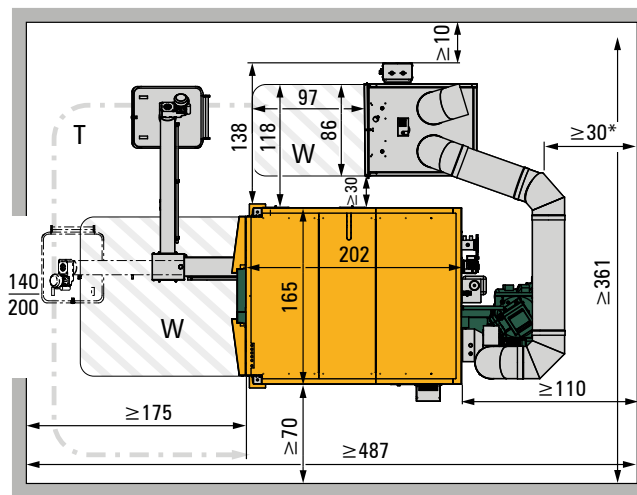
## Installation dimensions



Standard model with KWB dust filter E<sup>Plus</sup> on the right



Standard model with KWB dust filter E<sup>Plus</sup> on the left



## Legend

CS	It is recommended to always place the conveyor system on the E-Filter side to keep open the access to the maintenance areas. In this case, the recommended distance between E-Filter and boiler is $\geq 40$ cm instead of $\geq 60$ cm.
H	If a bypass attachment is planned, the min. room height increases by $\geq 40$ cm.

P	Alternative position Door area: Valid for all models. The door must be in the drawn-in area - deviations require consultation with KWB!
T	If the door is not directly in front of the system, the space requirement in front of the system increases to at least $\geq 225$ cm.
W	Maintenance area

\* If the conveyor system is installed diagonally, the planning must include an additional clearance of  $\geq 20$  cm to the rear wall! You must also take the gear unit and motor positions into account.

REI90 according to ÖNORM EN 13501, EI2 30-C according to ÖNORM EN 13501, E30 according to ÖNORM EN 13501

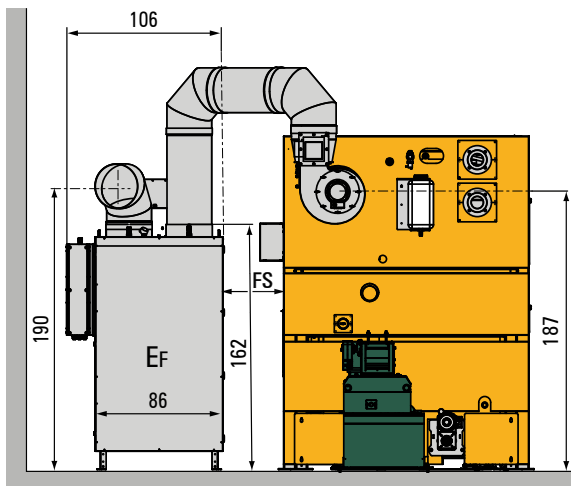
All distances stated are minimum dimensions and apply only to the installation variants shown! With regard to space requirements, please also note the exhaust gas pipe routing and chimney position - the space requirements for reducers and elbows may influence the minimum distances! It must be possible to dismantle the entire casing at any time. The minimal room dimensions for the ash containers as displayed in the illustration. Individual planning is possible after consultation with KWB.



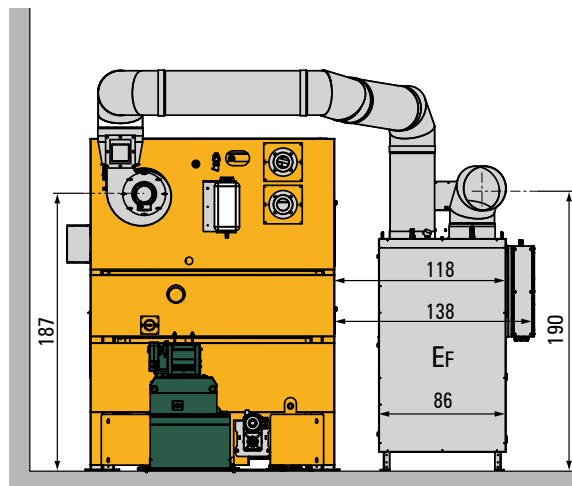
# KWB Powerfire 240 / 300 kW with dust filter E<sup>Plus</sup>

Connecting dimensions with dust filter E<sup>Plus</sup>

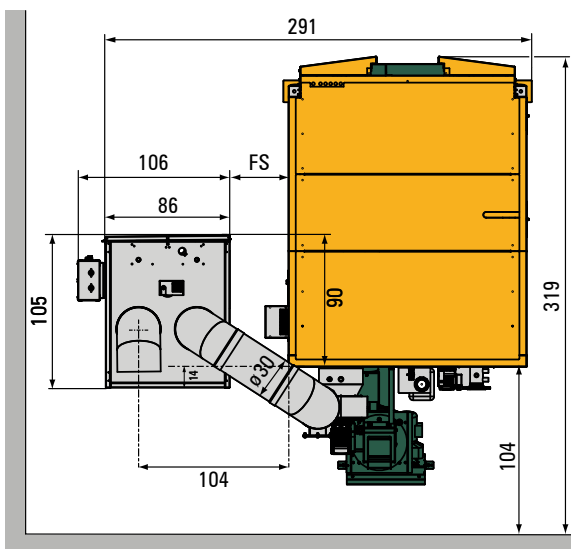
Standard model with  
KWB dust filter E<sup>Plus</sup> on the right



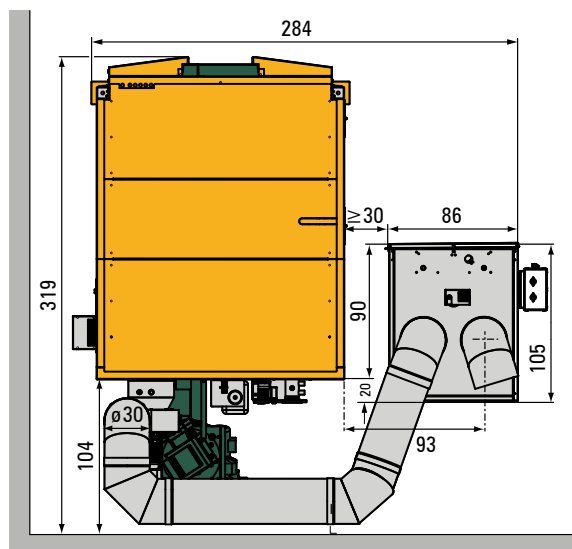
Standard model with  
KWB dust filter E<sup>Plus</sup> on the left



Standard model with  
KWB dust filter E<sup>Plus</sup> on the right



Standard model with  
KWB dust filter E<sup>Plus</sup> on the left



# KWB Powerfire 240 / 300kW

## Technical data

TDS	Unit	TDS 240		TDS 300	
		Pellet	Wood chips	Pellet	Wood chips
Rated power	kW	240	240	300	300
Partial load	kW	72	72	72	72
Boiler efficiency at rated power	%	96,0	95,8	95,7	95,5
Boiler efficiency at partial load	%	96,1	95,7	96,1	95,7
Fuel thermal output at rated power	kW	250,0	250,5	313,5	314,1
Fuel thermal output at partial load	kW	74,9	75,2	74,9	75,2
Boiler class according to EN 303-5:2012 + KWB dust filter	–	5	5	5	5
<b>Water side</b>					
Water content	l	610	610	610	610
Water connection diameter flow/return (flange)	–	DN 80 PN 6	DN 80 PN 6	DN 80 PN 6	DN 80 PN 6
Water connection for thermal safety valve	Inch	3/4	3/4	3/4	3/4
Thermal safety valve: temperature <sup>1</sup>	°C	10	10	10	10
Thermal safety valve: pressure <sup>1</sup>	bar	2	2	2	2
Boiler filling and emptying at the burner (internal thread)	Inch	3/4	3/4	3/4	3/4
Boiler emptying at the flame pipe (internal thread)	Inch	3/4	3/4	3/4	3/4
Boiler emptying at the heat exchanger (internal thread)	Inch	3/4	3/4	3/4	3/4
Water-side resistance at 20 K <sup>2</sup>	mbar	22	22	32	32
Water-side resistance at 10 K <sup>2</sup>	mbar	88	88	129	129
Boiler inlet temperature ≤w30	°C	55–70	55–70	55–70	55–70
Boiler inlet temperature >w30	°C	–	65–70	–	65–70
Working temperature/operating temperature	°C	90	90	90	90
Maximum permitted temperature	°C	110	110	110	110
Maximum operating pressure	bar	4	4	4	4
<b>Flue-gas side (data for chimney design)</b>					
Combustion chamber temperature	°C	900–1200	900–1000	900–1200	900–1000
Combustion chamber pressure	mbar	-0,2... -0,3	-0,2... -0,3	-0,2... -0,3	-0,2... -0,3
Delivery pressure at rated power / partial load	mbar	0,10 0,06	0,10 0,06	0,10 0,06	0,10 0,06
Induced draught required	–	✓	✓	✓	✓
Exhaust-gas temperature at rated power / partial load	°C	160 80	160 80	160 80	160 80
Exhaust-gas connection height (boiler side)	mm	–	–	–	–
Exhaust-gas connection height: variant up	mm	1.970	1.970	1.970	1.970
Exhaust-gas connection height: variant right (pipe centre, 0–90° pivoting) <sup>7</sup>	mm	1.380	1.380	1.380	1.380
Exhaust-gas connection diameter	mm	300	300	300	300
Incline of the exhaust-gas pipe	°	≥ 3	≥ 3	≥ 3	≥ 3
Recommended chimney diameter	mm	350	350	350	350
Chimney design: moisture-resistant	–	✓	✓	✓	✓
Maximum water content	–	M10	M30/M45	M10	M30/M45
Exhaust-gas mass flow at rated power <sup>3</sup>	kg/s	0,160	0,176 0,192	0,193	0,215 0,234
Exhaust-gas mass flow at partial load <sup>3</sup>	kg/s	0,048	0,055 0,060	0,048	0,055 0,060
Exhaust-gas volume at rated power <sup>3</sup>	Nm <sup>3</sup> /h	446	499 555	538	607 674
Exhaust-gas volume at partial load <sup>3</sup>	Nm <sup>3</sup> /h	133	155 173	133	155 173
<b>Electrical system</b>					
Connection: 5-pin	–	400 VAC 50 Hz 16 A	400 VAC 50 Hz 16 A	400 VAC 50 Hz 16 A	400 VAC 50 Hz 16 A
Unit switch and main switch: present	–	✓	✓	✓	✓
Connected power boiler	W	3600	3600	3600	3600
Connected power total incl. fuel extractor	W	5100	5100	5100	5100
Auxiliary power consumption in trial operation at rated power <sup>5</sup>	kW <sub>el</sub> /MW <sub>th</sub>	1,76	1,80	1,65	1,66
Auxiliary power consumption in trial operation at partial load <sup>5</sup>	kW <sub>el</sub> /MW <sub>th</sub>	3,53	2,66	3,53	2,66
Auxiliary power consumption at rated power <sup>5</sup>	W	418	428	470	477
Auxiliary power consumption at partial load <sup>5</sup>	W	238	182	238	182
Standby power	W	34	34	34	34
<b>Ash</b>					
Ash-container volume – fly-ash	l	20+44	20+44	20+44	20+44
Ash-container volume – grate-ash	l	66	66	66	66
Ash container, grate ash, full	kg	75	75	75	75
Ash-container volume, comfort version (optional)	l	66+125	66+125	66+125	66+125
Ash-removal system	–	✓	✓	✓	✓
Ash-container volume (optional)	l	120	120	120	120
Weight of ash container, full	kg	~140	~140	~140	~140
Ash-container volume (optional)	l	240	240	240	240
Weight of ash container, full	kg	~265	~265	~265	~265



TDS	Unit	TDS 240		TDS 300	
Weights					
Heat exchanger incl. cleaning grille	kg	900	900	900	900
Burner housing incl. chamotte	kg	866	866	866	866
Flame pipe incl. chamotte	kg	965	965	965	965
Stoker trough	kg	137	137	137	137
Total weight (empty)	kg	2868	2868	2868	2868
Assembly case	kg	288	288	288	288
Weight of transport packaging (in each case)	kg	25	25	25	25
Noise emissions <sup>6</sup>					
Normal operating noise at rated power	dB(A)	63	63	63	63
Operating peaks at rated power	dB(A)	65	65	65	65
Test report					
Test report no.	–	O-B-00575-21	O-B-00581-21	O-B-00575-21	O-B-00581-21

<sup>1)</sup> In acc. with EN 303-5; higher temperatur respectively lower minimum admission pressure available on request

<sup>2)</sup> The water-side resistance is specified and determined in each case on the boiler interface (flange RF/FF)

<sup>3)</sup> with reference to damp flue gas

<sup>4)</sup> Wood chips: Provision of the rated power to M30, above there is a reduction in power dissipation.

<sup>5)</sup> The noise measurements were executed in normal operation with wood chips.

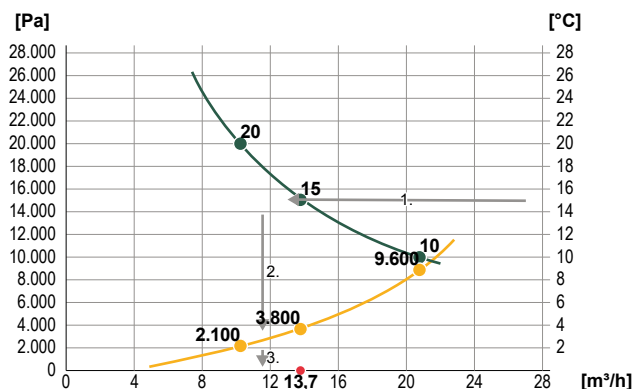
Leq(A) at 1 m distance (ISO 11202:2010)

<sup>6)</sup> Values only for standard-boiler-configuration. NOT for cellular wheel sluice, cyclone or E-Filter (own dimensioned drawings)  
mg/Nm<sup>3</sup> ... Milligram per standard cubic meter (Nm<sup>3</sup>... under 1013 hectopascal at 0 °C)

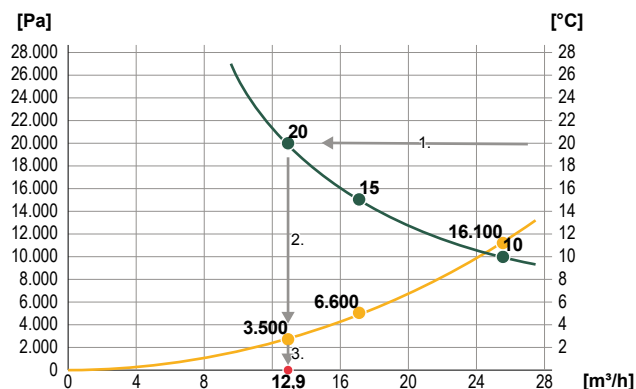
## Water-side resistance

The return flow boost groups for KWB Powerfire 150 can be found in module „K“.

### TDS 240



### TDS 300



## Legend

1. Read from right to left to the intersection of the spread
  2. Read downward to the intersection of the resistance
  3. Read downward to the volume flow
- HW-side resistance

- HW-side resistance
- HW-side spread
- HW-side spread

## Recommended parameters for boiler circuit pumps, control valves or return flow mixers

Boiler pumps - parameters		Control valve or return flow mixer
Boiler performance [kW]	min. Ø forward, return flow	Kvs [m³/h]
240	DN80	63
300	DN80	63

## Notes