

## ETA HACK 20 – 200 kW

*A new standard for safe  
fuel conveying systems*



$$\eta = \frac{Q_{\text{heat output}}}{Q_{\text{fuel input}}}$$

## ETA – a name born of conviction

In the world of technology, the Greek letter "η" (eta) stands for efficiency. By calling our company "ETA" we emphasize our goal of achieving maximum efficiency.

## A passion for perfection

In developing boilers for logwood, pellets and wood chips, our top priority is the use of effective and environmentally friendly technology. Clean emissions, minimal energy requirements, reliable function and simple operation – these are the guidelines we follow in developing all of our products. And we do that with the very latest, state-of-the-art technology. With our holistic approach melding ecology, economy and technology, we design perfect boilers for the future.

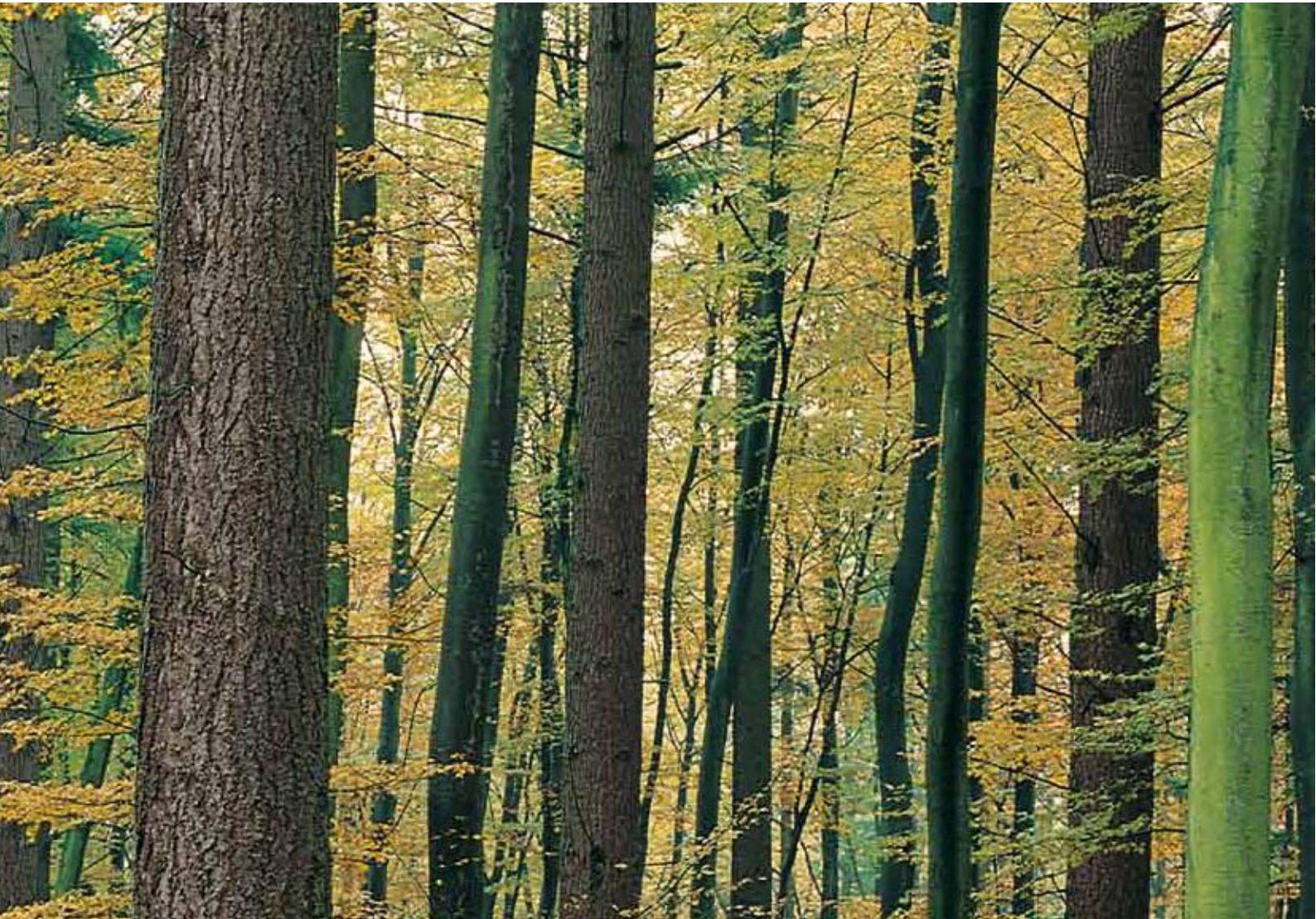
## Totally uncompromising

To ensure that the ETA HACK unit in your boiler room operates with top efficiency and low emissions throughout the season, irrespective of the type of wood you use and regardless of whether it is still green or already dry, each ETA woodchip boiler has a lambda probe as standard equipment.

We assume that ease of use and convenience are important to you, so each ETA HACK system includes heating circuit control via outside temperature sensor as well as automatic and complete ash removal.

Our building block concept gives you a variety of choices for storing and conveying fuel so that our system can make optimum use of the space available in your building. However, we only offer the ETA HACK woodchip boiler in a single version, totally uncompromising.





## Promoting naturally balanced heating



Wood-burning central heating systems utilize local, sustainable sources of energy, thus fitting into the natural carbon cycle. The combustion of wood produces carbon dioxide and water vapour. With energy from the sun, carbon dioxide and water are essential to the growth of new wood.

In contrast to oil, gas and coal, wood burns without releasing carbon from underground deposits into

the atmosphere as carbon dioxide, so energy from wood does not cause climate change.

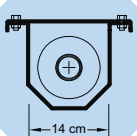
Those who choose this environmentally friendly form of heating are not only acting in the common interest but also receive public funding. A number of development programmes for private households, agricultural operations and businesses support your decision to use locally produced sustainable fuels.



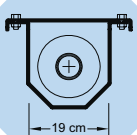


## Automatic fuel recognition

Which wood will you be using to operate your boiler? Today you may be thinking of spruce chips straight from the forest, but tomorrow a furniture factory may offer you very dry beechwood waste – no problem! With the lambda probe, the ETA HACK control system measures the residual oxygen in the flue gas and adjusts the fuel input and air supply according to the energy density of your fuel. Whether you use moist spruce chips, loose dry wood waste or very dense pellets – the control system adapts to the fuel perfectly.



for HACK 20 – 90 kW



for HACK 130 and 200 kW

## Industry standard

Coarse industrial wood chips from a sawmill can be burned without difficulty. With their generous cross-sections for wood chips up to 5 cm (G50), the fuel conveying system's trough screw conveyors can also easily handle individual pieces up to a cross-section of 5 cm<sup>2</sup> and lengths of up to 12 cm.

The chips are loosened by conveyor screws with progressively increasing pitch along the length of the closed feeder channel, ensuring smooth and quiet fuel flow.

## Better performance with less electricity

Frequently used worm gears have an efficiency of around 65%. ETA's fuel conveying systems use top-quality spur gears with an efficiency of over 95%. These gears, combined with the progressive screw, can lead to a reduction in electricity consumption of around one-third.

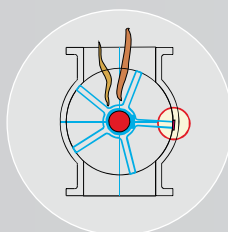
## No blockages

The amount of electricity required by the motor is constantly monitored and so any blockages or resistance that build up in the feeder screw are immediately registered, automatically reversing the screws and repeating up to three times if necessary. The floor agitator is simultaneously decoupled via clutch so the motor's power is exclusively available for unblocking the screw. Jammed pieces of wood or even stones can be easily loosened this way so fuel transport can resume.

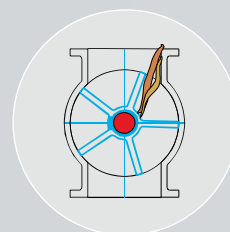
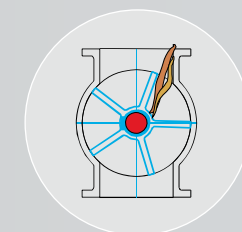
## One-chamber rotary valve protects against back-burn

ETA sets new standards in safety with the airtight one-chamber rotary valve. In contrast to conventional burn-back flaps, it can never be in a position with a direct connection between the combustion chamber and the fuel store. No hot gas can enter the fuel conveying system and ignition of the wood chips is impossible. This is the most reliable possible protection against burn-back.

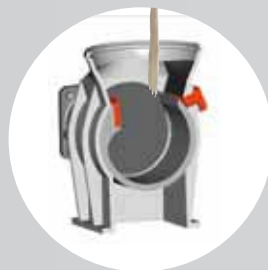
The one-chamber rotary valve, newly developed by ETA, can handle wood chips up to G50 in size. Pieces of wood that are too long are cut by a hardened, replaceable blade on the edge of the chamber. The stoker motor requires only a minimal amount of power to also drive the one-chamber rotary valve, so you have maximum safety with minimum electricity consumption.



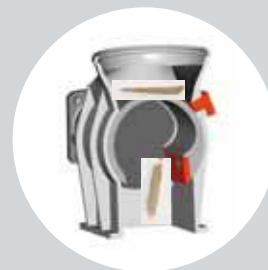
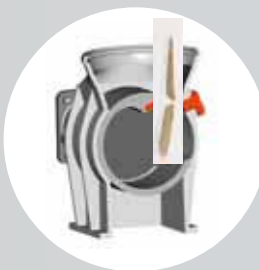
### Conventional rotary valve



- with coarse chips, more energy required
- more wear and noise
- small seal area
- long pieces of wood block the boiler



### ETA HACK one-chamber rotary valve



- low energy consumption, even with coarse chips
- less wear, quiet
- large seal area, maximum back-burn protection
- blades cut longer pieces of wood

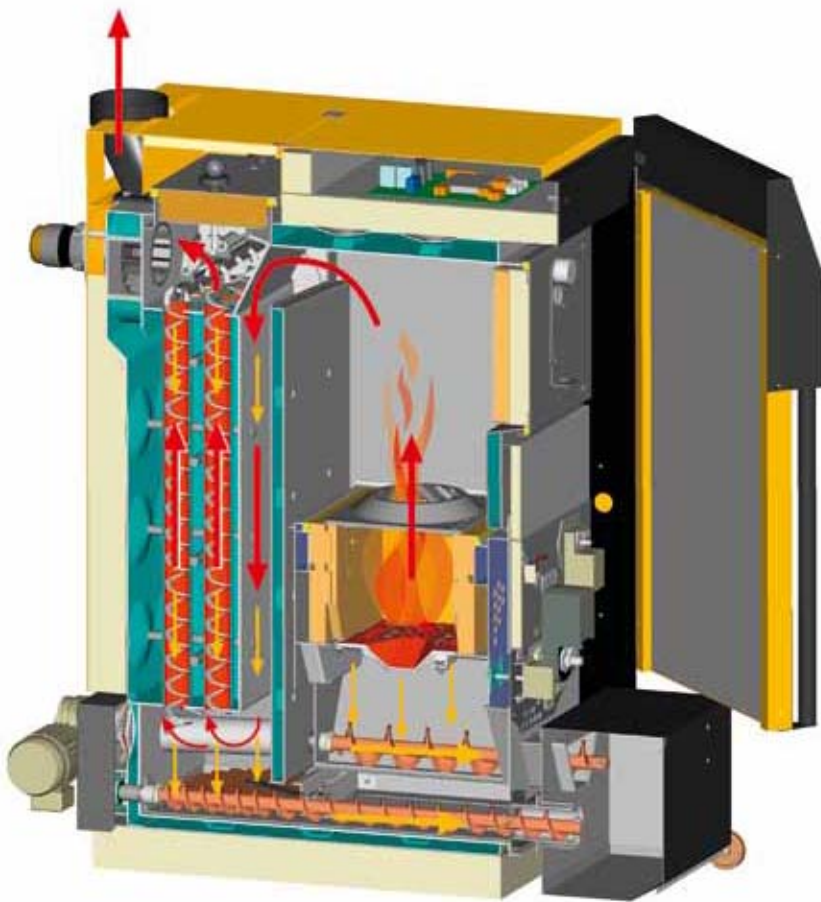


## Automatic, complete ash removal

Cleanliness is a priority for ETA HACK, because only a clean boiler works at its highest efficiency. So automatic operation must provide for automatic ash removal throughout the system, from the grate to the heat exchanger.

The heat exchanger tubes are automatically cleaned by means of agitated turbulators. The grate is also tilted on a regular basis. Two discharge screws, simultaneously driven by a motor, transport the ash from the ash collecting area below the grate and from the reversing chamber below the tubular heat exchanger into an ash box, which is situated at the front of the boiler for easy removal.

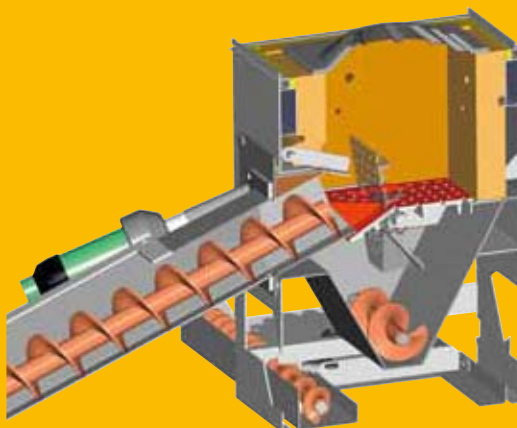
Bottlenecks in the ash flow are studiously avoided so neither stones nor nails can block the ash transport.



## Hot combustion chamber with tilting grate

A refractory-lined combustion chamber with secondary air turbulence ensures a clean fire with a high burnout temperature even with wood chips with up to 35% moisture content.

Without diversions and bottlenecks, the chips are pushed onto the side of the grate. At intervals that depend on the output level, the grate is tilted by 90° after a controlled ember burnout in order to automatically remove ash and foreign bodies from the combustion chamber.



# Combustion pauses with minimal heat loss

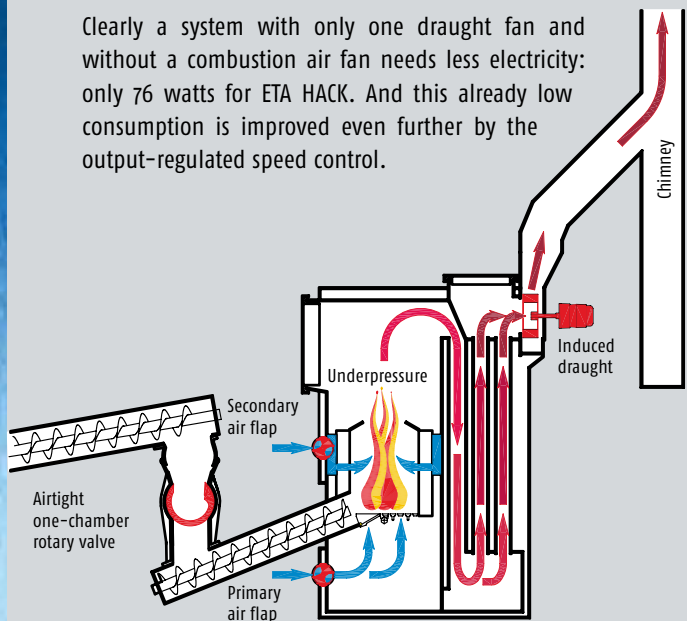
The fire can be regulated between minimum and maximum settings. In autumn and spring, when heating loads are smaller, the output is regulated by pauses in combustion. To avoid a build-up of smouldering tar in the boiler and chimney during these pauses, the fire undergoes a controlled burnout. Closing the primary and secondary air flaps ensures that no air can flow through the boiler in standby, thus preventing unused heat from being drawn into the flue.



## Induced draught

The induced draught technique (i.e. without a combustion air fan) proven in use with logwood and pellets is also used by ETA with wood chips. A quiet draught fan at the boiler outlet causes underpressure throughout the boiler, thus ensuring high operational safety without risk of deflagration. The airtight one-chamber rotary valve makes the usual combustion air fan unnecessary. The required air is drawn into the combustion chamber through the regulated primary and secondary air flaps as a result of the underpressure within the boiler.

Clearly a system with only one draught fan and without a combustion air fan needs less electricity: only 76 watts for ETA HACK. And this already low consumption is improved even further by the output-regulated speed control.



## Optimised ignition

After short breaks in combustion, the refractory-lined combustion chamber still remains hot enough that any new fuel which is fed in can be ignited by remaining embers. The ignition fan only needs to be activated after longer periods without combustion. To save electricity, the ignition fan is deactivated again immediately after successful ignition, which is recognised by the lambda probe and exhaust temperature.

## Fits all chimneys

ETA's wood chip heating systems can be adapted to every chimney. The draught fan makes small chimney cross-sections possible. The variable-speed draught fan and the continuously regulated flaps controlling the combustion air supply mean that no draught limiters (up to 15 Pa flue draught) are needed in the chimney.

By setting the exhaust temperature, condensation is avoided in brick-lined chimneys and the low-temperature suitability of modern chimneys can be fully exploited.



## Induced draught

Variable-speed, quiet and economical, only 76 watts, air regulation independent of flue draught, no excess pressure in the combustion chamber – no risk of deflagration



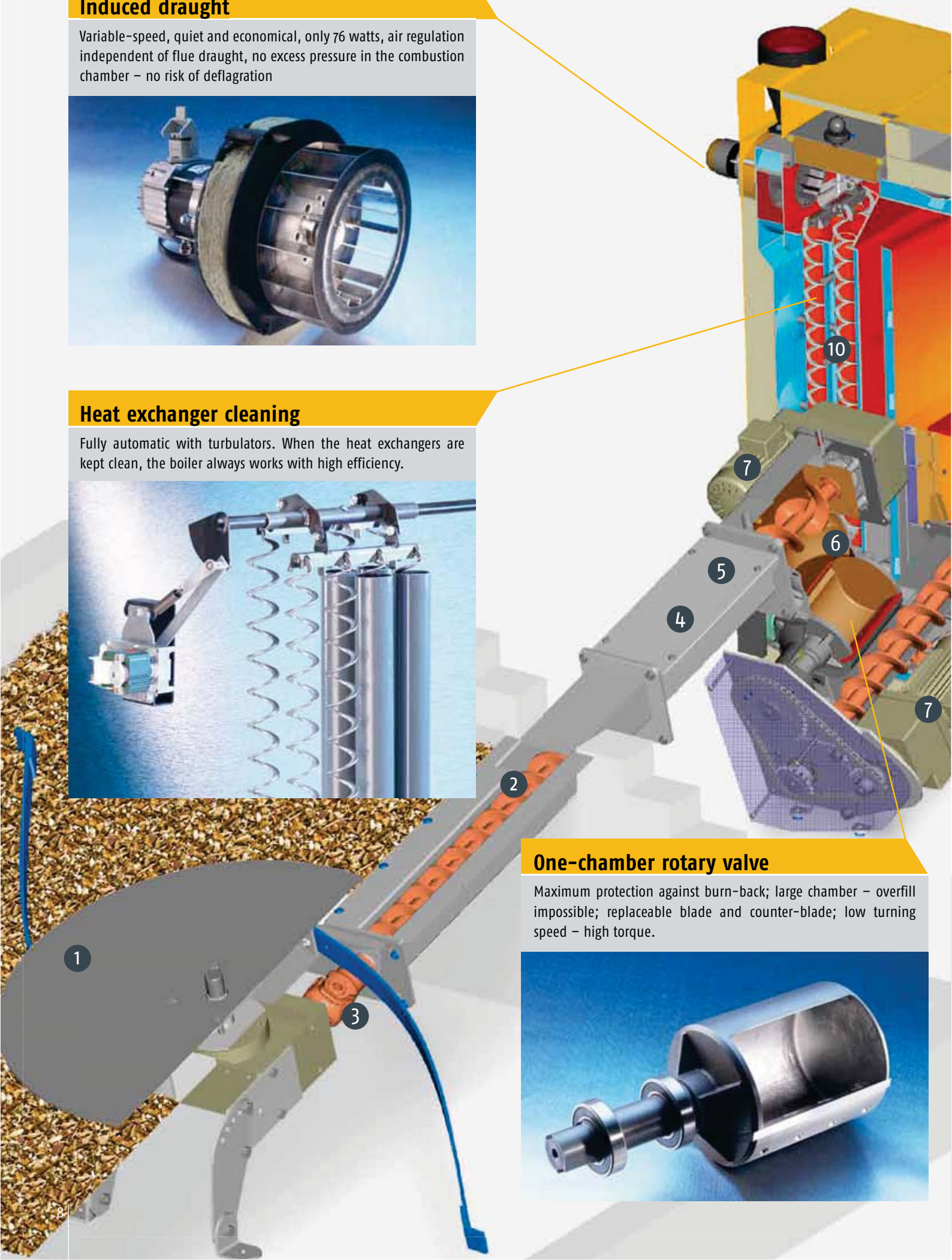
## Heat exchanger cleaning

Fully automatic with turbulators. When the heat exchangers are kept clean, the boiler always works with high efficiency.

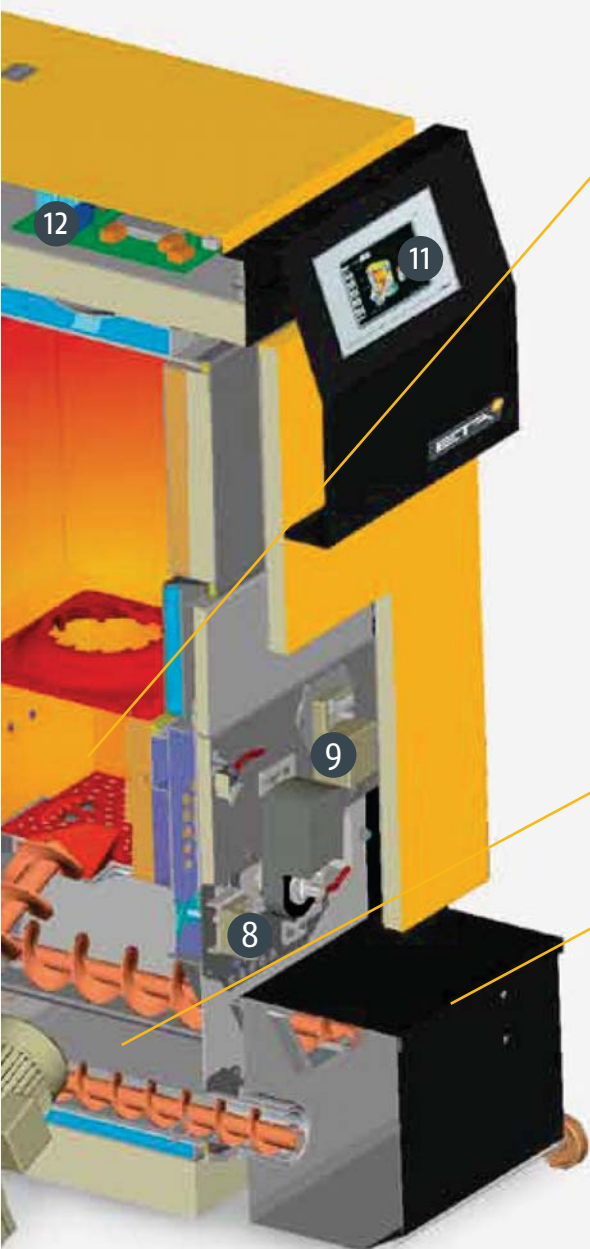


## One-chamber rotary valve

Maximum protection against burn-back; large chamber – overflow impossible; replaceable blade and counter-blade; low turning speed – high torque.







## Hot combustion chamber with tilting grate

As the fuel is pushed onto the grate from the side, the system is less sensitive to foreign bodies. Grate tilts over 90° – automatically removing ash, slag, stones and nails



## Complete ash removal

Grate ash and flue ash are automatically moved away along two screw conveyors without bottlenecks into a single ash box

## Ash box

Large volume – longer deashing intervals



### 1 Store conveyor

The floor agitator has robust flat-spring arms with a diameter of 1.5 – 4 m, and from 4.5 – 6 m with hinged arms.

### 2 Conveyor screws

With generous feed cross-sections, quiet and electricity-saving transport, from fine pellets to coarse industrial wood chips (G50).

### 3 Free-running hub

In case of conveyor blockage, the screws are briefly run in reverse. The floor agitator is decoupled.

### 4 Removable cover

### 5 'Building block' system

Any conveyor screw length up to 6 m, in steps of 0.125 m, is possible with standard parts – no cutting or welding on-site.

### Universal joint

Flexible adaptation of the conveyor screw to local conditions with continuous adjustment to any required gradient and angle.

### Spur gear motors

Large power reserve due to high efficiency and low electricity consumption:  
0.37 kW for discharge conveyor,  
0.25 kW for rotary valve/stoker

### 8 Primary and

### 9 Secondary air flap motors

Lambda-regulated air-flow regulation in every phase of the combustion process.

### 10 Heat exchanger

Generously proportioned for low exhaust temperatures, thus making optimum use of fuel.

### 11 Control panel

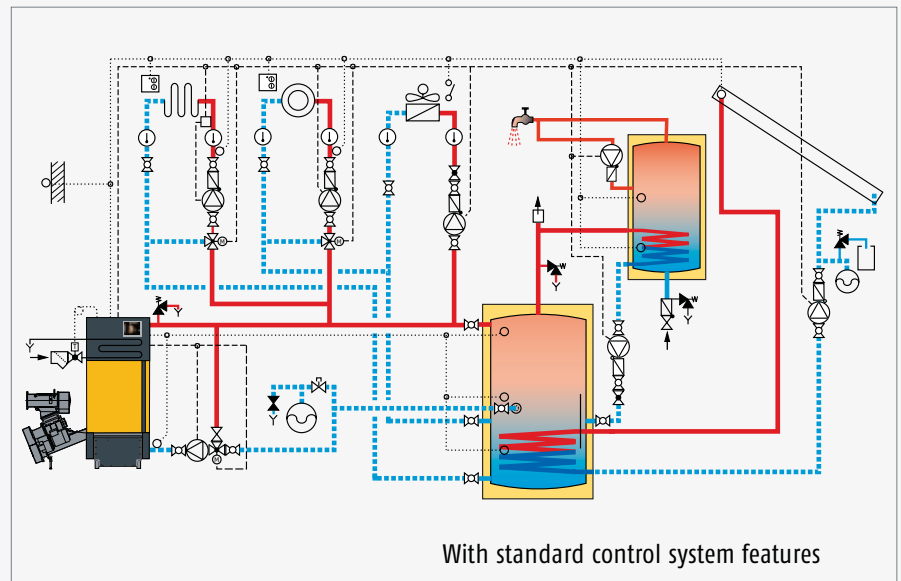
Integrated into the front of the casing door

### 12 Boiler control

All electronics are integrated in the boiler, (no external housing for switches).

## Standard features

- ① Output modulation with variable-speed draught fan
- ① Combustion regulation with lambda-controlled fuel adaptation
- ① Continuous monitoring of operating state, incl. lambda and exhaust temperature, boiler and tank temperatures, return riser, power consumption of all conveyor drives, reporting of draught fan speed, position reporting for tilting grate and air valve actuators, reporting of firebed level; plain text notification of faults with troubleshooting instructions
- ① Automatic ignition with lambda-controlled ignition time reduction
- ① Buffer charging pump and return riser via mixing valve with outputmanagement (up to 5 buffer sensors possible)
- ① Two weather-dependent heating circuits with weekly programme, three daily time slots, come-and-go function, holiday reduction; optionally expandable with room sensors and remote control
- ① 5 freely selectable temperature displays
- ① Standard LAN connection for remote control via Internet, optional GSM modem for SMS notifications
- ① Peak-load management or cascading regulation for multiple boilers



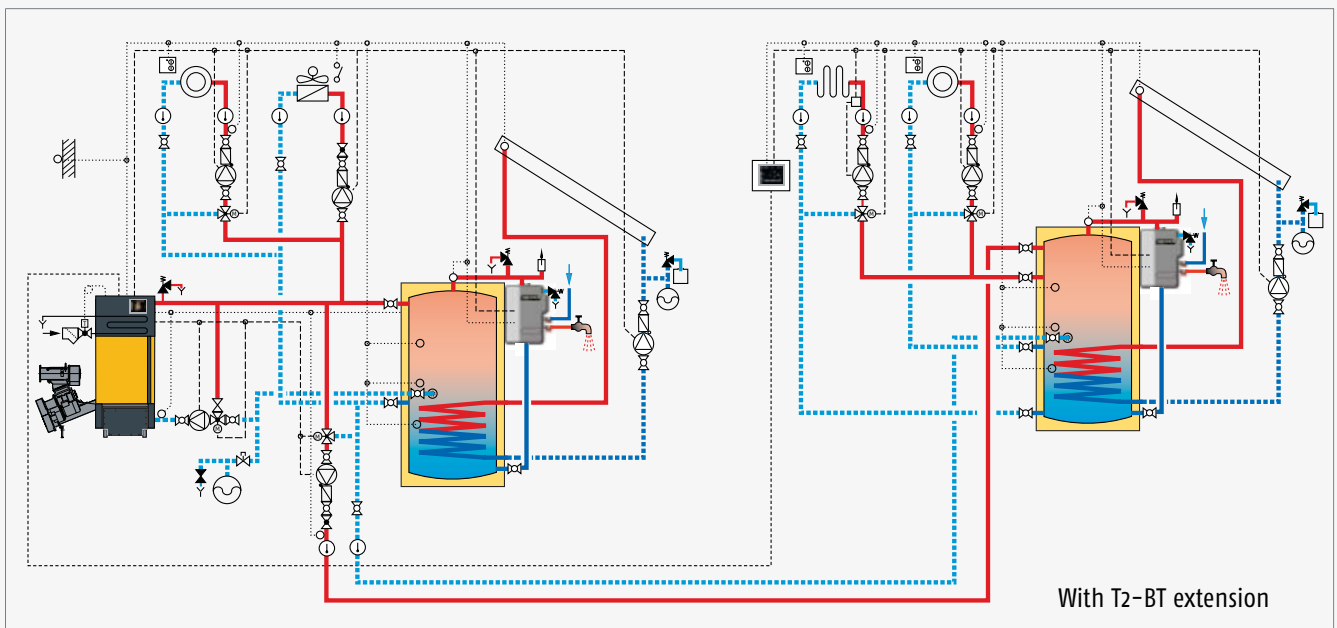
### 4 free outputs for a selection from the following 6 functions:

- ① Hot water supply with tank, fresh water module or internal water heat exchanger in a buffer with a weekly programme
- ① Hot water circulation pump with time programme or, in case of fresh water module, start with brief opening of tap by flow switch
- ① Solar heating system with variable-speed pump, solar heat quantity calculation
- ① External heat demand with constant boiler flow temperature

- ① Pump for heating pipeline or external consumer with/without mixing valve (one of the two heating circuit outputs is required for the mixing valve)
- ① If external heat is supplied, the boiler can be turned off and consumers switched to the external heat source

## Optional expansion with wall box

- ① Two additional heating circuits
- ① 4 additional outputs
- ① Regulation of complex solar heating systems with stratified charging





## Convenience and thrift

The convenience and thriftiness of the entire heating system, from the boiler to the radiators or underfloor heating, are a matter of course for an ETA boiler control. A solar heating system can also be integrated into this control system.

No worries about the electronics. Once the boiler control has been set up, you only use the control system's touchscreen to get status information about your heating system. If you need to change settings anyway at some point, that's also easy to do. Instead of switches and buttons, there are self-explanatory pictures. You can enter commands by tapping on the symbols on the screen.



## Active control for dependability

Safe operation is ensured by the comprehensive measurement and reporting of all statuses, such as the draught fan speed, power consumption of drive motors, air flap position, residual oxygen in flue gas, return riser, exhaust temperature or hot water temperature.

If something like a large stone blocks the fuel conveyor, text messages on the display provide clear instructions for clearing up the problem quickly.



## Intelligent bus for multiple buildings

If multiple buildings are supplied from a central heating plant or the boiler is situated in an outbuilding, the ETA HACK is the ideal solution thanks to its bus-enabled control system.

Every building has its own control station with touchscreen and can also be integrated into the boiler control via the CAN bus. Then the measurement values from all system components are available and make optimised control of the entire system possible based on the current total heat requirement.

## Remote control via Internet

The ETAtouch control system features a touchscreen to enable simple configuration and switching using self-explanatory images. This control interface can be transferred to the Internet via a LAN output. The boiler can thus be remote controlled by any conventional means of Internet access such as PC, smartphone with touch interface (iPhone, Android ...) or SmartTV. An optional GSM modem (available as accessory) also allows the boiler to issue fault messages via SMS.

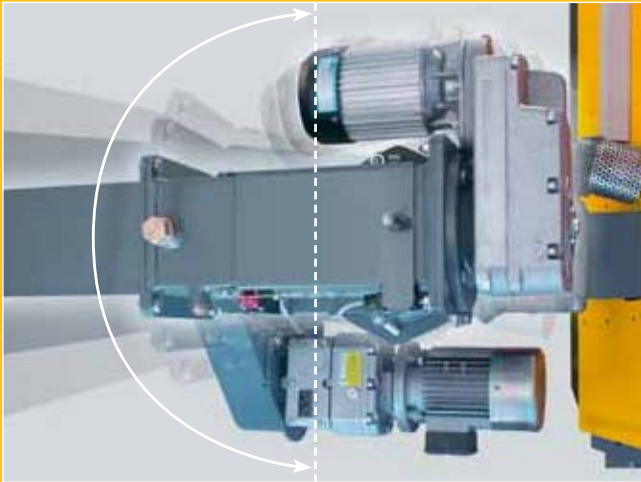


## A custom fit with the ETA "building block" system

The cleverly designed "building block" system reduces construction time and makes it possible to flexibly assemble the entire system from standard components.

The boiler can be supplied with a stoking mechanism mounted on either the right or the left side. There are no serviceable parts on side of the boiler opposite the stoker, so the boiler can be positioned close to the wall, saving space.

Trough screw conveyors (up to 6 m total length, standard lengths in steps of 125 mm), assembly with the PTO shafts (1 3/8" spline shaft) popular from agricultural applications, and screwed flange connectors for the troughs make installation possible without cutting and welding. Length changes are easy by exchanging screw extensions.



### Ball joint

With the universal joint at the inlet of the one-chamber rotary valve, the conveyor screw's gradient and angle to the boiler can be continuously adjusted.





## Fuel conveying system

Floor agitators are the most economical way to move the fuel from a storeroom next to or above the boiler room into the conveyor screw. ETA's 'building block' system offers floor agitators with flat-spring arms with spans ranging from 1.5 m to 4 m, and from 4.5 m to 6 m for hinged arms.

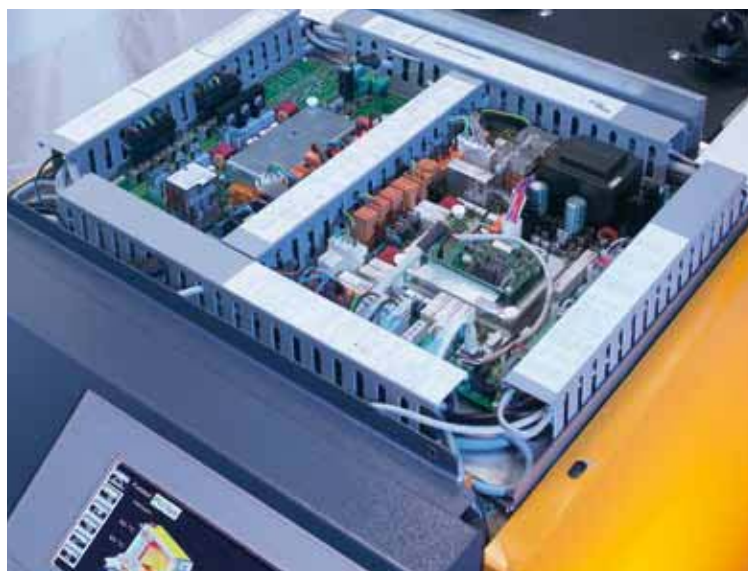
Filling screws with a diameter of 250 mm and a transport capacity of up to 30 m<sup>3</sup>/h make it possible to feed fuel into otherwise inaccessible cellar areas.

Our range of fuel storage equipment also covers special needs, including movable pivot augers for high silos or intermediate and inclined conveyor screws to overcome differences in height.

## ETA PE-K only for pellets

For pellet combustion only, the ETA PE-K is available with up to 90 kW and pellet bin and pellet stoker. With the pneumatic pellet conveyor system with flexible hoses (DN50), a separation of up to 20 m between the pellet store and the boiler is possible.

For details, see the brochure for ETA PE-K 35 – 90 kW.



## Wired and ready for use

The entire control system is integrated in the top of the boiler and easily accessible. There is no external housing for switches, so the boiler is completely wired when it leaves the factory. This saves both time and work. All you need to do is plug in the drive motor and safety switches for the discharge conveyor and stoker screw, wire the heating area's pumps, mixers and temperature sensors, connect the boiler control to the electric power supply, and set the parameters. Then you can begin heating operation.

## Rule of thumb for wood chip requirements

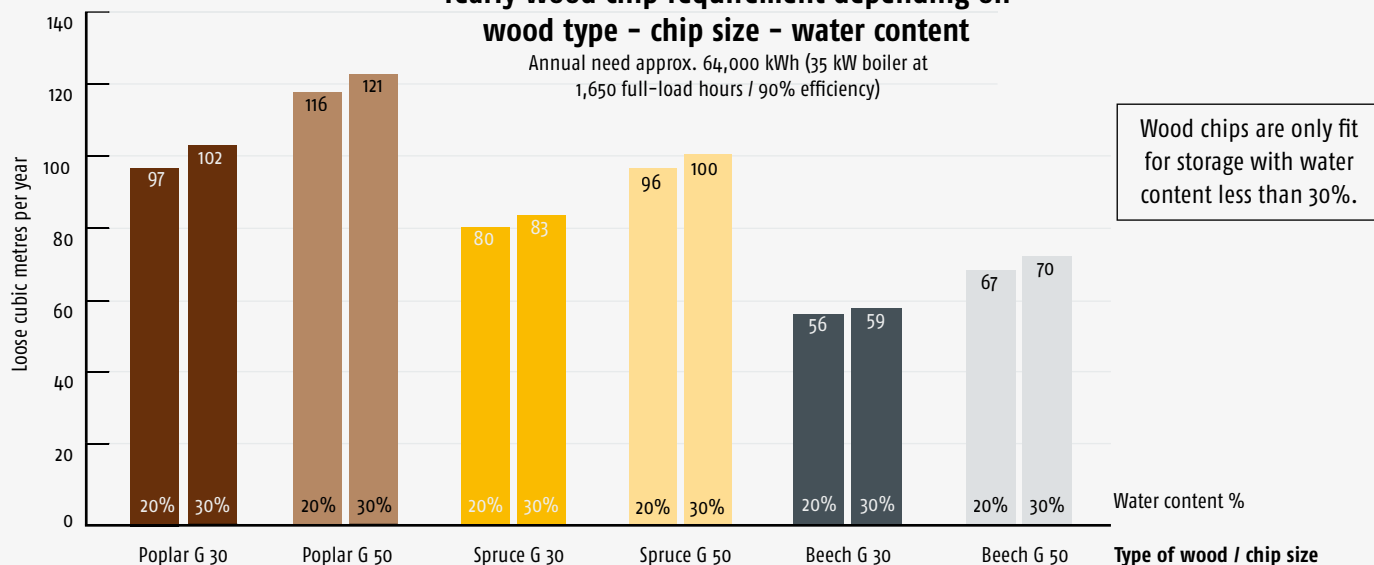
A loose cubic metre (lcm) of finely chopped spruce chips (G 30) with 20% water content has an energy content of 800 kilowatt hours (kWh).

For example, 35 kW heating load for an older building with 300–400 m<sup>2</sup> or for a very well-insulated new building with 600–800 m<sup>2</sup>

**35 kW x 2 for good wood chips = 70 lcm/year**  
**35 kW x 3 for poor wood chips = 105 lcm/year**

### Yearly wood chip requirement depending on wood type – chip size – water content

Annual need approx. 64,000 kWh (35 kW boiler at 1,650 full-load hours / 90% efficiency)



## Rule of thumb for pellet requirements

Heating value of pellets 4.9 kWh/kg, bulk density 650 kg/m<sup>3</sup>, 9% water content

For example, 35 kW heating load for an older building with 300–400 m<sup>2</sup> or for a very well-insulated new building with 600–800 m<sup>2</sup>

**35 kW divided by 3 = 12 tons of pellets/year**  
**35 kW divided by 2 = 17.5 cubic metres/year**

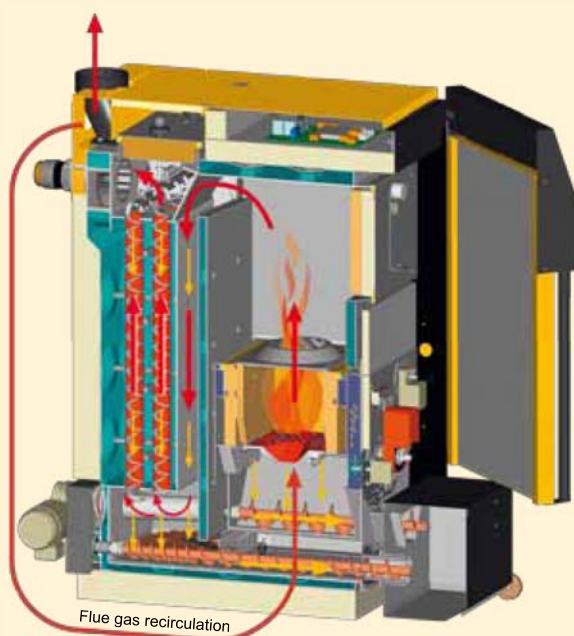
## Rule of thumb for miscanthus requirements

Heating value 4.4 kWh/kg, bulk density 120 kg/m<sup>3</sup>, 15% water content  
 Miscanthus (elephant grass) needs a larger combustion chamber, which reduces the boiler output by a third. If you want to heat throughout the year with miscanthus, you will need a bigger boiler.

For example, 35 kW heating load for an older building with 300–400 m<sup>2</sup> or for a very well-insulated new building with 600–800 m<sup>2</sup>

**35 kW divided by 2.7 = 13 t miscanthus/year**  
**35 kW multiplied by 3 = 105 cubic metres/year**

## Flue gas recirculation for pellets, miscanthus and dry carpentry waste

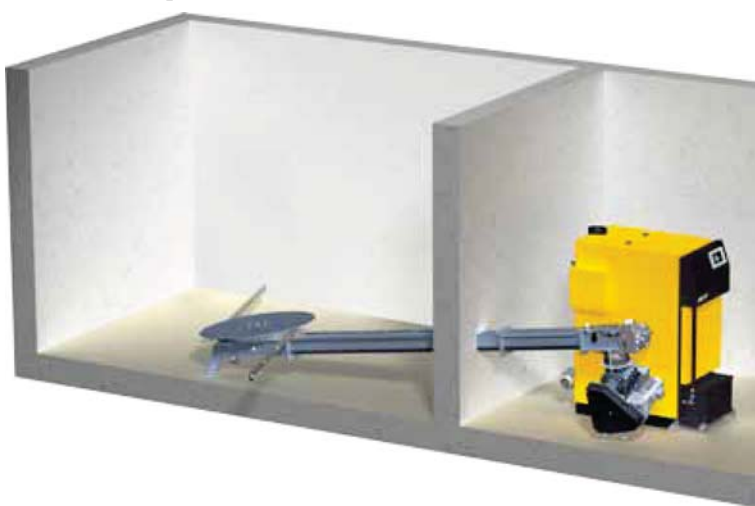


Flue gas recirculation is available as an accessory for very dry fuels. It increases the gas flow through the grate as well as through the fire. The grate is cooled better. The distribution of the fire's heat over a larger gas volume helps to achieve a narrower and more stable temperature window. Temperatures are held safely above 800°C for complete, clean combustion and safely below 1,000°C, far below the melting point of wood ash. Then worrisome slag formation on the grate is prevented when burning pellets, miscanthus and very dry carpentry waste.

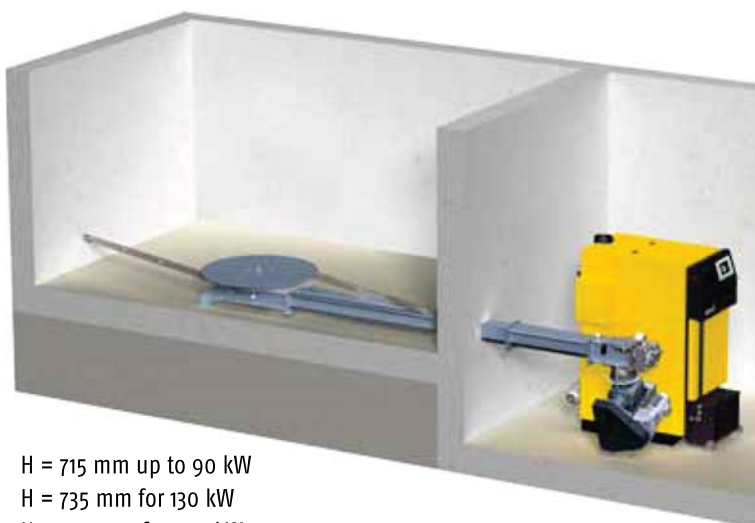




## Tilted is possible



## Level is better

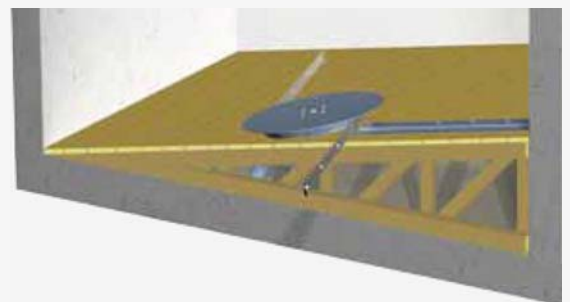


H = 715 mm up to 90 kW  
H = 735 mm for 130 kW  
H = 790 mm for 200 kW

## The ETA floor agitator adjusts to the building

With continuously adjustable feet under the agitator plate, the tilt can be exactly adjusted, even with height differences between boiler room and store. The ETA floor agitator can be installed with or without a tilted floor.

**Without a false floor** the installation of the floor agitator is easier. Quiet operation is assured. The dead space is simply filled with a load of very dry wood chips (15% water content) on the first fill-up.



### With false floor

no wood chips are left behind in the storeroom. The store can be ventilated through the floor. The false floor can also be concreted.

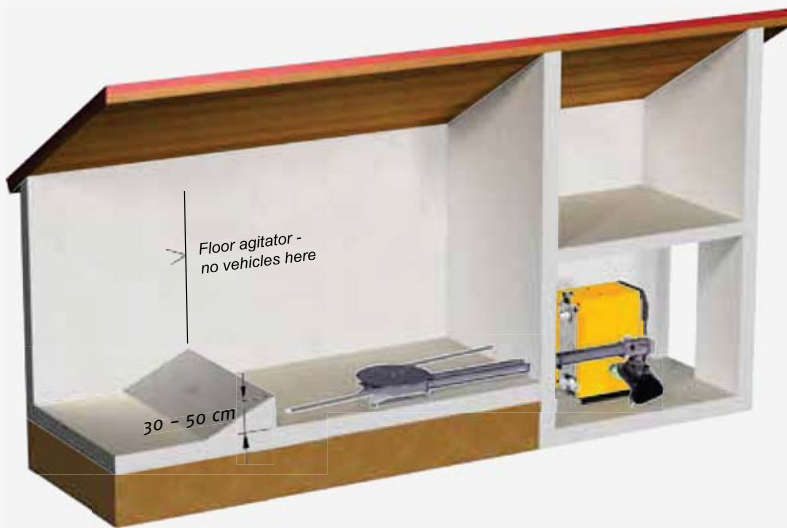
**When the boiler room floor is lower** the agitator lies level in the storeroom. This installation is possible with and without a raised floor.

## Pellet discharge screw if only pellets are to be burned



## Compact pellet storage for up to 6 m fill height

If there is no room for fuel manipulation and little room is available for storage, then pellets are at an advantage. The energy density of pellets is four times that of wood chips. A heating load of 200 kW consumes either 400 lcm of wood chips or only 100 lcm (65 tons) of pellets. That is three truckloads. With sufficient reserve between two deliveries, 50 m<sup>3</sup> of storage space is enough. At a fill height of 6 m, a storage surface area of only 3 x 3 m is needed. To make such compact storage possible, we offer a special pellet discharge conveyor with a screw with a maximum open trough length of 6 m for the wood chip boilers above 130 kW (up to 90 kW we offer the PE-K series). The benefits include quiet operation and gentle transport of the pellets, and the store is emptied completely. If the walls are suitably constructed, storeroom heights of up to 6 m are possible, making the system significantly cheaper than a floor agitator. Please note that flue gas recirculation is needed for operation with pellets (see bottom of page 14).



## At ground level with front end loader or push-off trailer

This kind of store is the classic success on farms and anywhere that a front end loader is available. It can also be realised with a simple and economical annex. Benefits include the high fill height and optimum fullness that can be achieved with this store.

Such high fill heights can't be reached with a push-off trailer, but unloading proceeds much more quickly.

Since driving on the agitator is not possible, loading for agitator diameters over 4.0 m can only be done with a telescopic handler.

## General rules for wood chip stores

Our floor agitators are designed for a maximum wood chip fill height of 5 m. From store outlet to stoker, a maximum trough screw conveyor length of 6 m is possible.

## General rules for pellet stores

Our agitators are designed for a pellet depth of 2 m. To minimise damage to the pellets, only flat-spring agitators up to 4 m in diameter may be used. A special cover plate for pellets is needed on the open trough screw conveyor in the store. The length of the trough screw conveyor from the store outlet to the stoker should not exceed 1.5 m. For operation with pellets only, our discharge screw (see bottom of page 15) is better suited. It also allows considerably greater fill heights.

## Dumping into a store below access level

If a new store is to be built, the best solution is an economical round layout that can be realised with typical manure pit formwork. To achieve a good fill even with the steep angle of repose for wood chips, the opening should be large. In the best case, it should be 2 m wide and extend across the entire diameter of the store.

Store diameters up to 6 m are possible. To prevent bridging, the agitator diameter should never be less than the store diameter.



## Other possibilities with the ETA building block system

Of course there are plenty of other possibilities in addition to the proven store variations described here. If your situation doesn't correspond to any of the proposals described here, we also offer special solutions based on our building block system, such as two agitators for a boiler or one agitator for two boilers. For fuel silos in carpentry workshops, we offer pivot augers. We build intermediate conveyor screws to overcome height

differences, direction changes and distances (up to 8 m). To limit energy consumption, these should not be installed with inclinations greater than 30°. We also use intermediate conveyor screws to form connections to existing storeroom conveying systems. With our building block system, we are able to build a technically perfect and very cost-effective discharge conveyor for almost every situation. To store an entire year's supply of over 100 m<sup>3</sup> completely on the discharge conveyor, large-scale fuel conveying systems are necessary, but charging them is not so simple. If a front end loader is needed for fill-up and replenishing anyway, then small floor agitators are usually the less complicated solution, even for large boilers.



## Filling cellar rooms with filling screws or filling nozzles

To adjust to the circumstances of an existing room, filling screws can be installed at an angle to the room's axis or also inclined (continuously adjustable up to 45°).

Floor agitator diameters up to 6 m are possible. For room heights less than half the agitator diameter, we recommend two screws for optimum filling.

If no filling hopper is possible due to construction constraints, filling nozzles for wood chips from a tanker are a feasible alternative. And if only pellets are to be used, filling nozzles are the better solution.

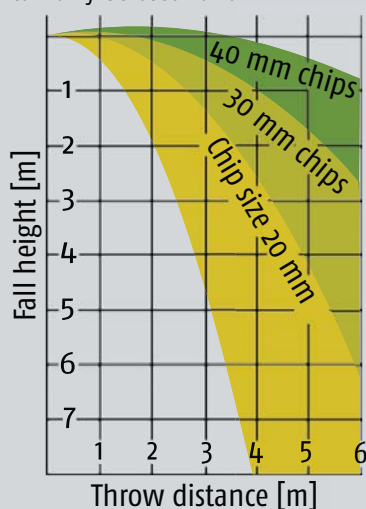


### For safety

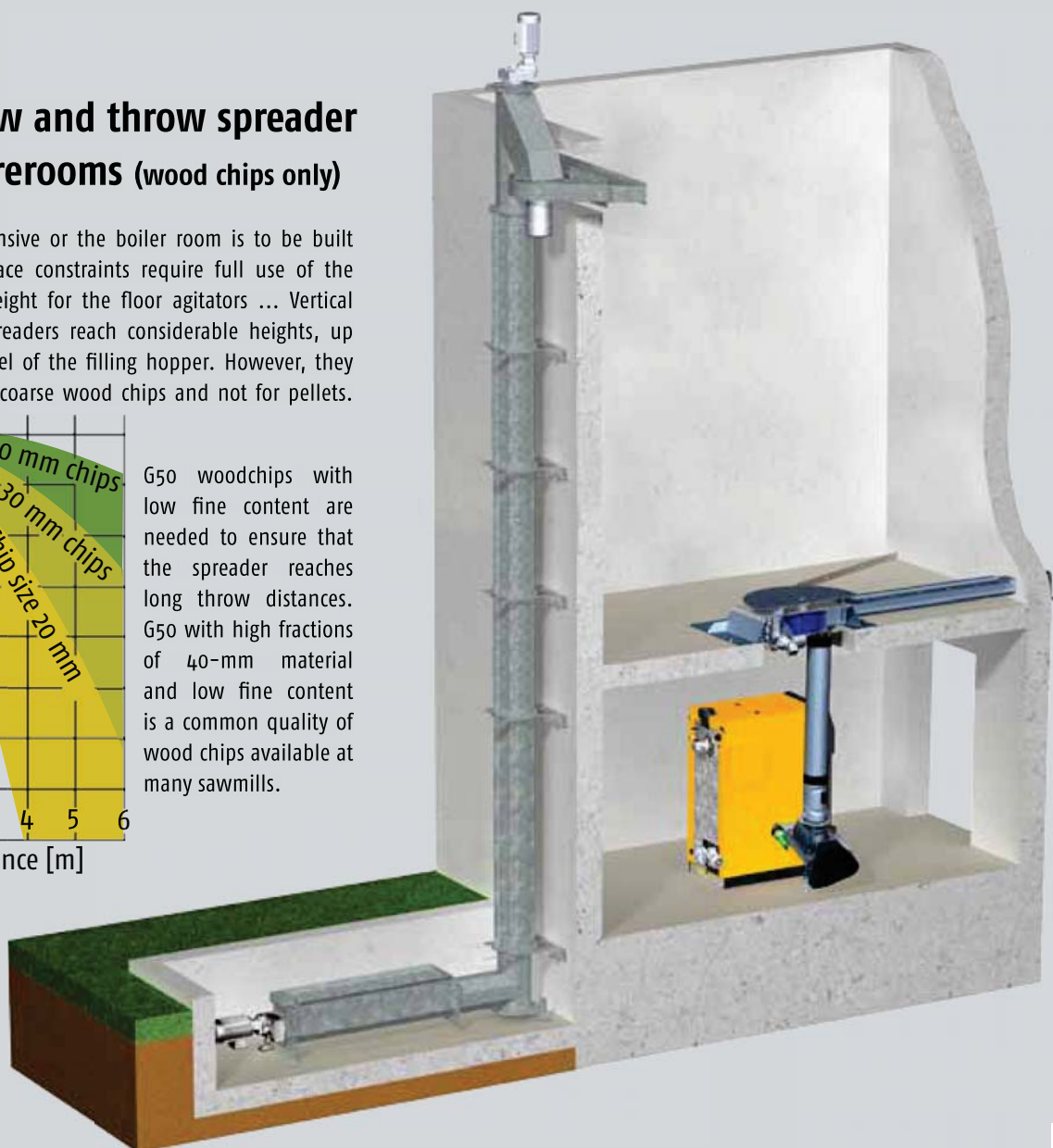
A protective screen over the opening has been integrated into all open filling hoppers. A vibrating motor ensures congestion-free passage of the wood chips. For special requirements we also offer an optional flush-fitting safety grate (2.5 x 1.0 m).

## Vertical screw and throw spreader for high storerooms (wood chips only)

If floor space is expensive or the boiler room is to be built in a high hall or space constraints require full use of the 5 m maximum fill height for the floor agitators ... Vertical screws and throw spreaders reach considerable heights, up to 8 m above the level of the filling hopper. However, they can only be used for coarse wood chips and not for pellets.

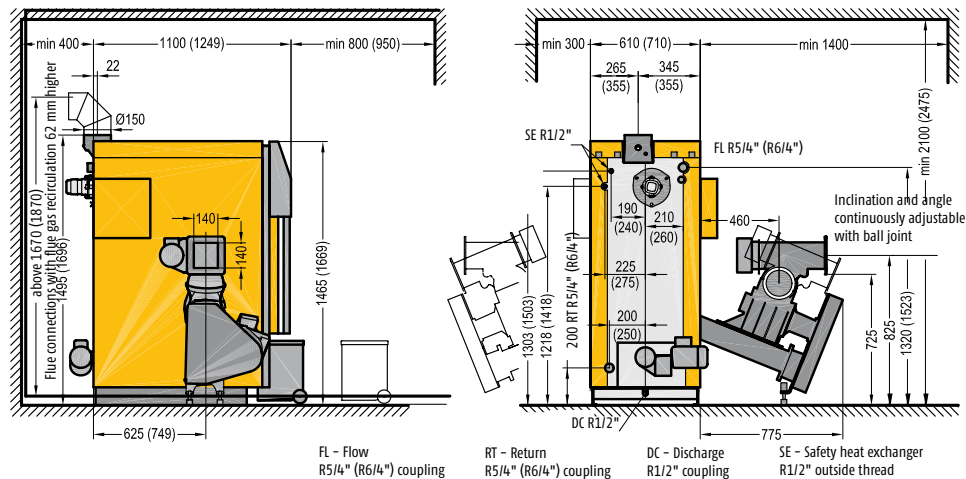


G50 woodchips with low fine content are needed to ensure that the spreader reaches long throw distances. G50 with high fractions of 40-mm material and low fine content is a common quality of wood chips available at many sawmills.



## ETA HACK 20 – 90 kW wood chip boilers

Boiler can be supplied with stoker on either the right or the left side.  
Numbers in parentheses apply for 70 and 90 kW.



### ETA HACK technical data

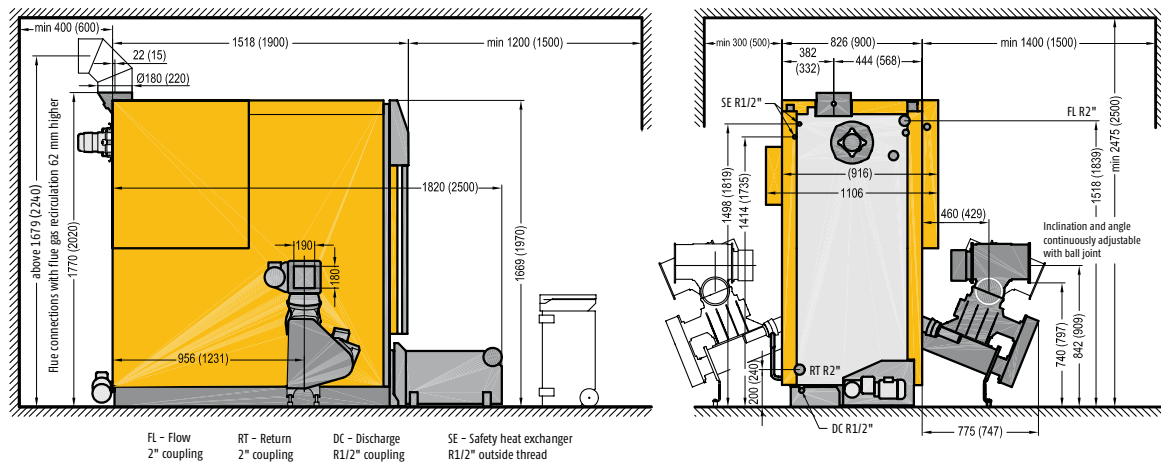
			20	25	35	50	70	90
Rated capacity	W25-S160 wood chips	kW	5.9-19.9	7.7-26.0	10.5-35.0	14.5-49.5	21.0-70.0	26.0-88.0
	Pellets			7.7-26.0	10.5-35.0	14.5-49.5	21.0-70.0	27.0-95.0
Efficiency partial/full load – spruce chips*	%		92.8 / 92.7	92.9 / 92.2	92.1 / 91.7	90.9 / 91.0	93.0 / 92.4	94.3 / 93.3
Wood pellet efficiency, partial/full load*	%			90.6 / 93.8	90.6 / 93.0	90.6 / 91.7	91.7 / 92.4	92.5 / 93.3
Transport dimensions, W x D x H	mm		710 x 1,100 x 1,495				810 x 1,249 x 1,696	
Transport width with housing removed	mm		590				690	
Weight with / without rotary valve and stoker	kg		735 / 590	735 / 590	736 / 591	737 / 592	911 / 864	911 / 866
Water content	Litres		117				196	
Water-side pressure drop ( $\Delta T=20^\circ$ )	Pa / mH <sub>2</sub> O		90 / 0.009	160 / 0.016	280 / 0.028	550 / 0.055	570 / 0.057	900 / 0.090
Ash box volume	Litres		35				44	
Flue gas mass flow rate, partial/full load	g/s		5.7 / 15.2	7.4 / 19.2	9.3 / 26.0	12.0 / 35.7	16.6 / 46.6	21.2 / 56.2
CO <sub>2</sub> content in dry flue gas, partial/full load	%		8.5 / 11.0	8.5 / 11.5	9.0 / 12.0	9.0 / 12.5	10.0 / 13.5	10.0 / 14.0
Exhaust temperature, partial/full load*	°C		70 / 110	75 / 130	88 / 140	85 / 150	85 / 145	90 / 155
Flue draught			2 Pa for partial load / 5 Pa for full load required					
			No draught limiter required up to 15 Pa					
Carbon monoxide (CO) emissions*	mg/MJ		108 / 17	62 / 13	47 / 14	26 / 15	23 / 8	21 / 4
Wood chips, partial/full load	mg/m <sup>3</sup> B%O <sub>2</sub>		156 / 24	91 / 19	69 / 20	39 / 22	33 / 12	30 / 6
Carbon monoxide (CO) emissions*	mg/MJ			44 / 7	28 / 8	7 / 9	9 / 6	10 / 2
Pellets, partial/full load	mg/m <sup>3</sup> B%O <sub>2</sub>			68 / 10	43 / 12	11 / 14	13 / 9	15 / 4
Dust emissions*	mg/MJ		8	6	7	8 / 9	8 / 9	8 / 9
Wood chips at full load	mg/m <sup>3</sup> B%O <sub>2</sub>		12	9	11	12 / 13	12 / 14	12 / 14
Dust emissions*	mg/MJ			4	5	3 / 6	2 / 6	2 / 7
Pellets at full load	mg/m <sup>3</sup> B%O <sub>2</sub>			7	7	4 / 8	4 / 9	4 / 11
Unburned hydrocarbon emissions (CxHy)*	mg/MJ		2 / < 1	1 / < 1	< 1 / < 1	< 1 / < 1	< 1 / < 1	< 1 / < 1
Wood chips, partial/full load	mg/m <sup>3</sup> B%O <sub>2</sub>		2 / 1	2 / < 1	1 / < 1	1 / < 1	1 / < 1	1 / < 1
Unburned hydrocarbon emissions (CxHy)*	mg/MJ			1 / < 1	< 1 / < 1	< 1 / < 1	< 1 / < 1	< 1 / < 1
Pellets, partial/full load	mg/m <sup>3</sup> B%O <sub>2</sub>			1 / < 1	1 / < 1	1 / < 1	< 1 / < 1	< 1 / 1
Electrical power consumption Spruce chips, partial/full load*	W		73 / 129	91 / 147	109 / 195	129 / 254	167 / 396	167 / 396
Electrical power consumption Wood pellets, partial/full load*	W			67 / 98	70 / 192	73 / 123	97 / 190	97 / 190
Maximum permissible operating pressure	3 bar	Boiler class	3 acc. to EN 303-5					
Temperature adjustment range	70 – 85°C	Suitable fuels	Wood chips G30/G50 to W35, ÖNORM M 7133, Pellets ÖNORM M 7135, DIN 51731, DIN Plus					
Maximum permissible operating temperature	95°C		EN 14961-2, ENplus A1					
Minimum return temperature	60°C	Electrical connection	3 x 400V / 50Hz / 13A					

\* Data from test reports by BLT Wieselburg, report numbers 047/03, 048/03, 052/09, 053/09, 057/09, 058/09. The test reports from the BLT Wieselburg test lab can be found on the Internet at: [blt.josephinum.at](http://blt.josephinum.at) (Test reports > Biomass boiler tests > Chipped wood heating boilers)



# ETA HACK 130 and 200 kW wood chip boilers

Boiler can be supplied with stoker on either the right or the left side.  
Quantities in parentheses for 200 kW



## ETA HACK technical data

		130	200
Rated capacity, wood chips W 25-S 160	kW	38.0-133.0	56.0 - 195.0
Rated capacity, pellets	kW	38.0-140.0	66.0 - 220.0
Efficiency partial/full load – spruce chips*	%	94.8/92.7	93.5 / 92.3
Wood pellet efficiency, partial/full load*	%	93.6/92.1	91.1 / 91.1
Transport dimensions, W x D x H	mm	930 x 1,520 x 1,770	1,106 x 2,100 x 2,020
Transport width, disassembled	mm	790	865
Weight with / without rotary valve and stoker	kg	1,334 / 1,189	1,950 / 1,800
Water content	Litres	290	448
Water-side pressure drop ( $\Delta T=20^\circ$ )	Pa / mH <sub>2</sub> O	750 / 0,075	1,700 / 0,170
Ash box volume	Litres	110	2 x 80
Flue gas mass flow rate, partial/full load	g/s	28.3 / 85.3	43.5 / 138
CO <sub>2</sub> content in dry flue gas, partial/full load*	%	11.1 / 13.9	11.0 / 13.0
Exhaust temperature, partial/full load*	°C	82 / 138	80 / 140
Flue draught		2 Pa for partial load / 5 Pa for full load required No draught limiter required up to 15 Pa	
Carbon monoxide (CO) emissions* Wood chips, partial/full load	mg/MJ mg/m <sup>3</sup> 13% O <sub>2</sub>	7 / 17 11 / 26	4 / 8 6 / 13
Carbon monoxide (CO) emissions* Pellets, partial/full load	mg/MJ mg/m <sup>3</sup> 13% O <sub>2</sub>	9 / 9 14 / 14	3 / 2 4 / 3
Dust emissions* Wood chips, partial/full load	mg/MJ mg/m <sup>3</sup> 13% O <sub>2</sub>	6 / 13 10 / 20	4 / 9 7 / 15
Dust emissions* Pellets, partial/full load	mg/MJ mg/m <sup>3</sup> 13% O <sub>2</sub>	11 16	2 / 4 4 / 7
Unburned hydrocarbons (CxHy)* Wood chips, partial/full load	mg/MJ mg/m <sup>3</sup> 13% O <sub>2</sub>	< 1 / 1 < 1 / 1	< 1 / < 1 < 1 / < 1
Unburned hydrocarbons (CxHy)* Pellets, partial/full load	mg/MJ mg/m <sup>3</sup> 13% O <sub>2</sub>	< 1 / 1 < 1 / 1	< 1 / < 1 < 1 / < 1
Electrical power consumption Spruce chips, partial/full load*	W	178 / 458	195 / 535
Electrical power consumption Spruce pellets, partial/full load*	W	107 / 253	118 / 300
Maximum permissible operating pressure	3 bar	Boiler class 3 acc. to EN 303-5 Suitable fuels Wood chips G30/G50 to W35, ÖNORM M7133, Pellets ÖNORM M 7135, DIN 51731, DIN Plus EN 14961-2, ENplus A1 Electrical connection 3 x 400 V / 50 Hz / 13 A	
Temperature adjustment range	70 - 85°C		
Maximum permissible operating temperature	95°C		
Minimum return temperature	60°C		

\* Data from test reports by BLT Wieselburg, report numbers 047/03, 048/03, 052/09, 053/09, 057/09, 058/09, 018/11, 027/07, 034/08, 035/08. The test reports from the BLT Wieselburg test lab can be found on the Internet at: blt.josephinum.at (Test reports > Biomass boiler tests > Chipped wood heating boilers)



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Listed on the  
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ETA PU PelletsUnit 7 to 15 kW  
(7, 11 and 15 kW)



ETA PC PelletsCompact 20 to 32 kW  
(20, 25 and 32 kW)



ETA PE-K pellet boiler 35 to 90 kW  
(35, 50, 70 and 90 kW)



ETA SH wood gasification boiler  
20 to 60 kW  
(20, 30, 40, 50 and 60 kW)



ETA SH-P wood gasification boiler  
20 and 30 kW  
with ETA TWIN pellet burner 20 and 26 kW



ETA HACK wood chip boiler 20 to 130 kW  
(20, 25, 35, 50, 70, 90 and 130 kW)



ETA HACK wood chip boiler 200 kW



ETA stratified buffer SP and SPS  
(825, 1000, 1100, 1650 and 2200 litres)



ETA stratified buffer SP and SPS  
with fresh water and stratified charging  
modules

Your heating specialist will be happy to advise you:



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