



Heating with Biomass



**Automated Boiler Systems
for Commercial, Industrial
and Larger Domestic Appli-
cations, for Community and
District Heating**



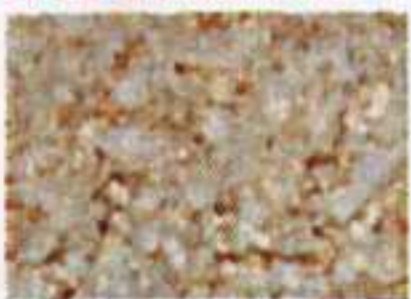



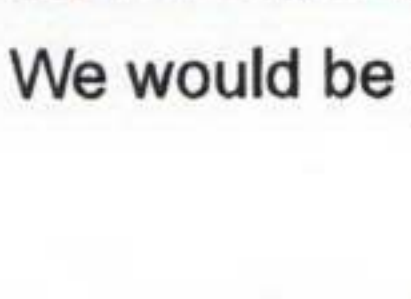
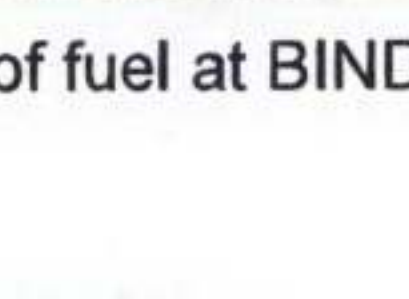



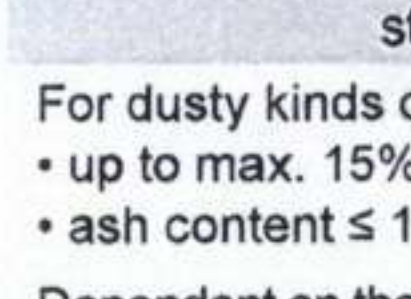


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Energy from biomass

BINDER – Sophisticated Boiler Systems

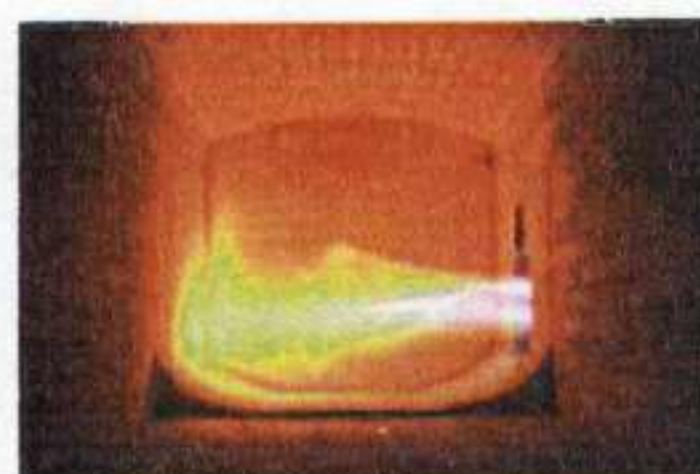


Biomass Fuels

	EBF	RRF	USRF	HSRF		USRF	HSRF	PRF	PSRF
 Sander dust	●				 Bark		●		
 Sawmill shavings		●	●		 Shreds from packing, building or demolition wood		●		
 Shavings from planing and milling		●	●		 Whole grain energy crops, chaffed	●			
 Particle boards, chipboards, MDF boards		●	●		 Pomace and other residues from food processing, etc.	●			
 Woodchips, forestal		●	●		 Wood pellets			●	●
 Arboricultural wood residues			●	●					
 Woodchips, cut-offs, industrial			●	●					

We would be pleased to check out your specific kind of fuel at BINDER's own firing laboratory.

Combustion and Stoker Systems

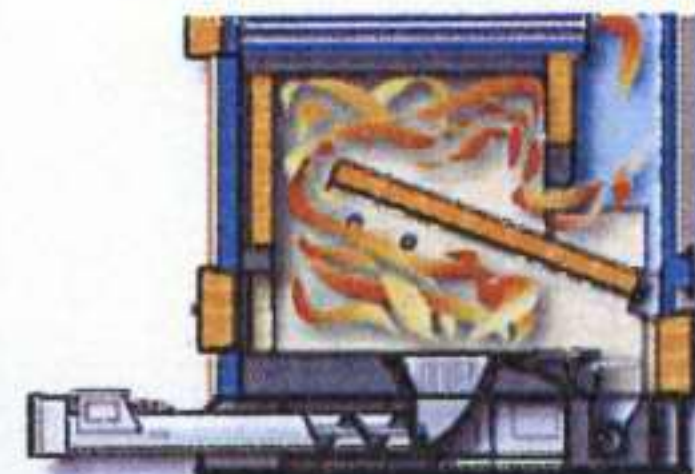


EBF – Injection burner with stoker auger

For dusty kinds of fuel:

- up to max. 15% moisture content
- ash content ≤ 1%

Dependent on the required heat capacity, dust is metered off the dosing silo and swirled into the combustion chamber using a high-pressure fan and a burner nozzle.

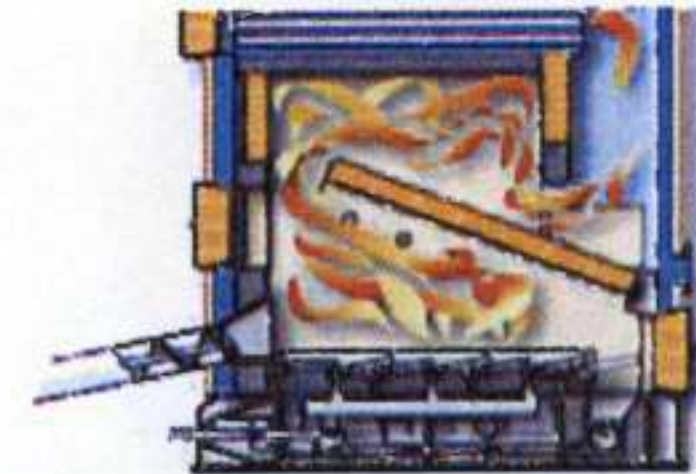


RRF – Solid retort burner with underfeed stoker auger

For low-ash fuels:

- up to max. 35% moisture content
- ash content ≤ 1%
- for granulated fuels up to size class G100*

Fuel is metered from beneath into the solid boiler retort by using a underfeed stoker auger. Supply may be from front, or from the sides.



USRF – Moving grate burner with horizontal stoker auger

For wet, high-ash fuels:

- up to max. 55% moisture content
- ash content > 1%
- for granulated fuels up to size class G100*

Fuel is metered into the combustion chamber by using a large front stoker auger, and then distributed along the chamber by the reciprocating grates.

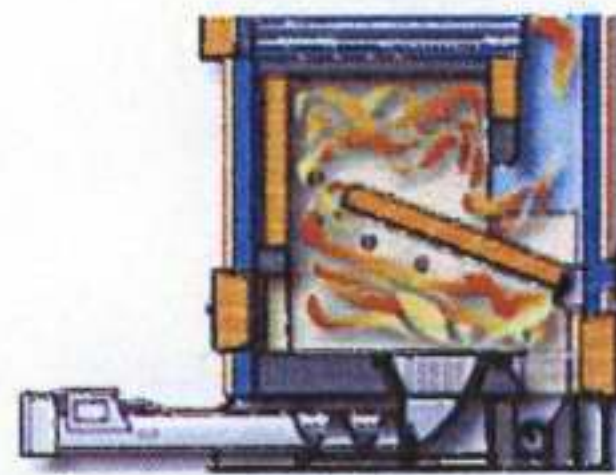


HSRF – Moving grate burner with hydraulic stoker ram

For wet, high-ash fuels:

- up to max. 55% moisture content
- ash content > 1%
- for coarse and shredded fuels up to size class G150* (with slivers up to 35 cm long)

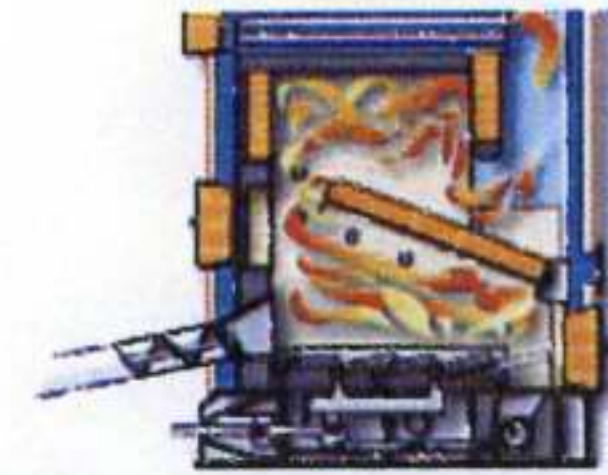
Fuel is metered into the combustion chamber by using a horizontal hydraulic ram, and then distributed along the chamber by the reciprocating grates



PRF – Solid retort burner for pellets with underfeed stoker auger

- for wood pellets

Pellets are metered from beneath into the solid boiler retort by using a underfeed stoker auger. Supply may be from front, or from the sides



PSRF – Moving grate burner for pellets with horizontal stoker auger

- for wood pellets

Pellets are metered into the combustion chamber by using a stoker auger, and then distributed along the chamber by the reciprocating grates. Supply may be from front, or from the sides

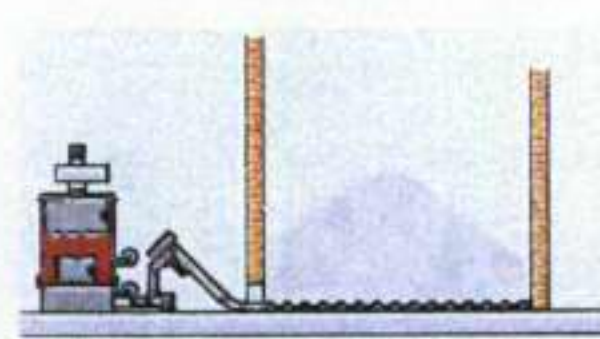
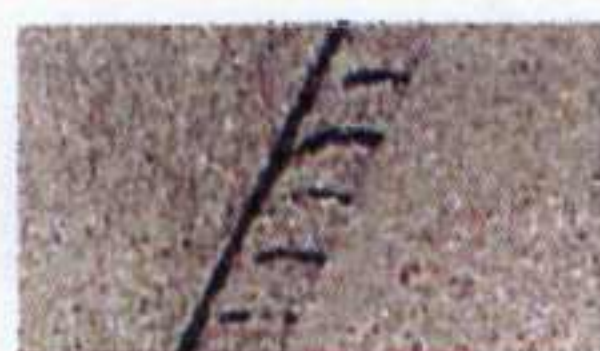
*)...Size class specifications depend on the kind of fuel and are for guidance only.

Optimised for Your Needs

Type	Nominal Capacity in kW	Heat exchanger	Combustion Systems						Type
			EBF	RRF	USRF	HSRF	PRF	PSRF	
RRK 15-20M	20.000	III	●			●		●	S
RRK 12-15M	15.000	III	●			●		●	
RRK 8-10M	10.000	III	●			●		●	
RRK 7-8M	8.000	III	●			●		●	
RRK 5-6M	5.000	III	●			●		●	
RRK 3-4M	4.000	III	●			●		●	
RRK 2500-3000	3.000	III	●	●	●	●		●	
RRK 1800-2300	2.300	III	●	●	●	●		●	
RRK 1200-1650	1.500	III	●	●	●	●	●	●	
RRK 1000	1.000	III	●	●	●	●	●	●	
RRK 640-850	800	C	●	●	●	●	●	●	u
	650		●	●	●	●	●	●	
	500		●	●	●	●	●	●	
RRK 400-600	400	C*	●	●	●	●	●	●	
	350		●	●	●	●	●	●	
	300		●	●	●	●	●	●	
RRK 200-350	250	C*	●	●	●	●	●	●	
	230		●	●	●	●	●	●	
RRK 130-250	185	C*	●	●	●	●	●	●	
	149		●	●	●	●	●	●	
	117		●	●	●	●	●	●	r
RRK 80-175	93	C*	●	●	●	●	●	●	
	70		●	●	●	●	●	●	
RRK 22-49	22 49	C*	●	●	●	●	●	●	
RRK 15-35	15 35	C*	●	●	●	●	●	●	

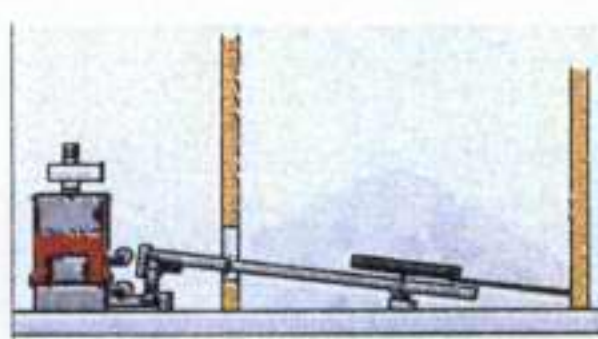
10 kW 100 kW 1.000 kW 10.000 kW

C...also available as containerised system, (*) with standard container



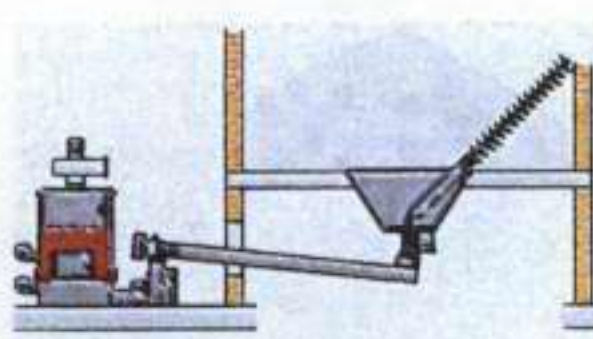
PS – Pellets auger

- with adjustable pressure relief device for rectangular bunkers
- suitable for the transport and bunker discharge of wood pellets



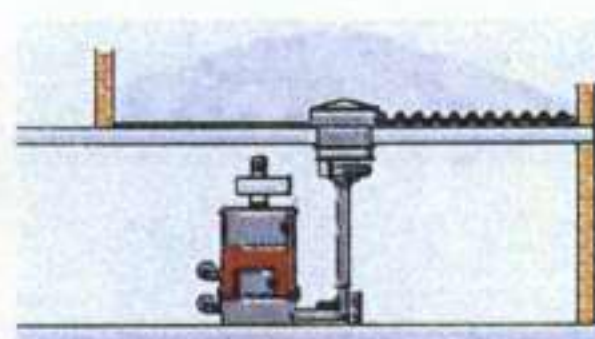
KA – Sweep arm agitator

- for granulated fuels up to size class G100*
- for storage heights* up to 20 m using pressure relief cover
- also available in FK design for smaller bunkers with lower storage heights



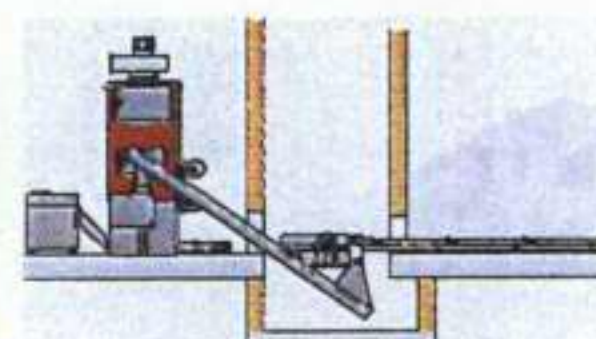
SS – Tapered sweep auger

- for silos accessible from the bottom with a diameter of up to 7 m
- for granulated fuels up to size class G100*
- for storage heights* up to 20 m



WS – Horizontal sweep auger

- for silos accessible from the bottom with a diameter of up to 10 m
- for granulated fuels up to size class G100*
- for storage heights* up to 30 m



SBA – Walking floor

- for coarse and shredded fuels up to size class G150* (with slivers up to 35 cm long)

*)... Size class specifications and storage heights are for guidance only, as they depend on the actual kind of fuel and design variant. Beware of bridging which might occur on a storage height that exceeds twice the silo width.

BINDER – A One-Stop Shop

As a systems supplier, BINDER provides and installs complete boiler systems – from the fuel container to the stainless-steel chimney, from the accumulator tank to the fully-fledged, mobile and containerised heating centre – with all the components produced and tested in-house.

- fully-fledged containerised boiler systems
- transport systems for fuels and ash
- fuel storage containers
- accumulator tanks
- stainless-steel chimneys
- shredders, etc.



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Energy from biomass

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Start – and Have Heat Generated Around the Clock



The BINDER range of biomass boilers sets a benchmark for convenience and comfort in handling:

- automated de-ashing*
- automatic cleaning of the heat exchanger*
- computer based capacity and combustion control* and accumulator tank management*

Start the boiler and have heat generated around the clock – with only bi-annual servicing for routine inspection and cleaning.



"Ease-of-use and the level of maintenance are comparable to conventional oil fired boiler systems. The only difference is an extra two or three fuel deliveries in a heating period, and even those could be triggered automatically."

Mayor Franz König,
municipal 500 kW pellet boiler system

High Overall Efficiency Across the Output Range

BINDER boilers achieve efficiency ratings of up to 92 percent¹.

- The CVP control package* gives fully modulating capacity control from 25% to 100%.
- Speed-control* on all fans minimises the electric power consumption.
- The Lambda O₂ regulation improves efficiency and brings out the most of your fuel.
- High quality engineering with a minimum on maintenance required provides for high availability.

¹)...Institute for air quality control, 2004, NUA-Umweltanalytik GmbH

Secure and Safe Systems

- The modem interface* with the boiler provides for immediate remote support through the internet and will ensure any future software extensions are available quickly.
- Using the BINDER Tele-package* you'll be notified automatically of any upcoming message – such as from the silo's fuel level control – even if there is a local power failure.
- Quadruple safety devices, approved and certified, prevent any fire reaching the fuel silo.



BINDER systems are built to last. Robust materials and good design ensures increased reliability, low maintenance costs and a long lifespan.

Clean Emissions

BINDER boilers are 'carbon-neutral' systems. They also have low pollution levels for NO_x, CO and particulates¹. This is due to:

- low-NO_x design*,
- superb combustion zone design allowing sufficient residence time to minimise unburnt gases,
- Lambda O₂ regulation to optimise the combustion on varying fuel quality,
- excellent exhaust gas cleaning, using mono/multi cyclones, electrostatic filters or baghouse filters*.

Lambda O₂ Regulation

This sensor system uses the exhaust O₂ level as an efficient indicator for complete combustion and ensures optimum combustion at all times:

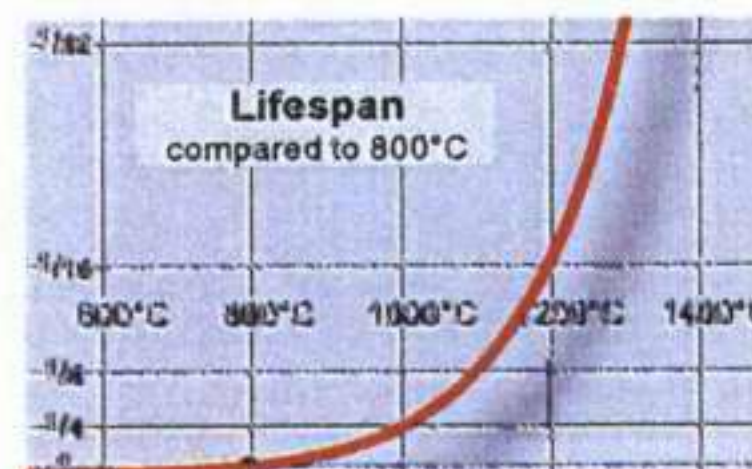
- It reacts to deviations from the average by automatically adjusting the air intake and/or fuel supply.
- It provides for stable combustion without emission peaks even where fuel quality varies.

Flue Gas Recirculation*

Depending on the temperature in the combustion chamber, this feature adds a regulated amount of flue gas to the combustion air. This:

- prevents over-high temperatures in the combustion chamber,
- reduces the risk of clinkering and deposit formation,
- enables a reduction in the exhaust O₂ level and thus, improves the efficiency.

This feature is particularly recommended for fuels with either a high calorific value, low ash fusion point or a high nitrogen content.



Because of the greater volume of flue gas in the combustion chamber, more heat is dissipated from here towards the heat exchanger. Lower overall temperatures also improve the lifespan of firebricks and the grate.

*...dependent on plant size and system configuration

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Tried and Tested Technology

Low-NOx Design*

For fuels with a high nitrogen content, such as bark or particle boards:

- Controlled flue gas recirculation* regulates combustion temperature and fuel-to-air ratio λ .
- Regulated air supply allows air staging in the pyrolytic stage, in the gasification and the oxidation stage.
- The optimum design of the combustion chamber provides for a long residence time for the fuel and good mixing of the flue gases. The net effect is a high efficiency and low-NOx boiler system.

Ideal Combustion Zoning

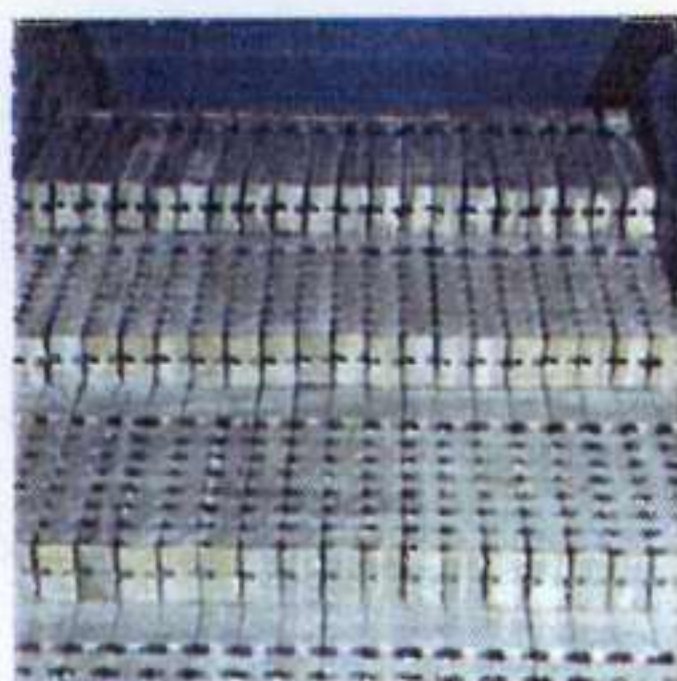
The flue gas flow complies with the TTT-principle (time, temperature, turbulence). It generates stable combustion resulting in low pollution and maximum efficiency under all load conditions.

- Rotation zone ② – provides for the optimal mingling of the unburnt flue gases
- Turbulation zone ③ – the hottest section of the combustion chamber provides for the complete oxidation of CO into CO₂
- Expansion zone ④ – the turbulent flue gases calm down, and most of the fly ash descends and settles.

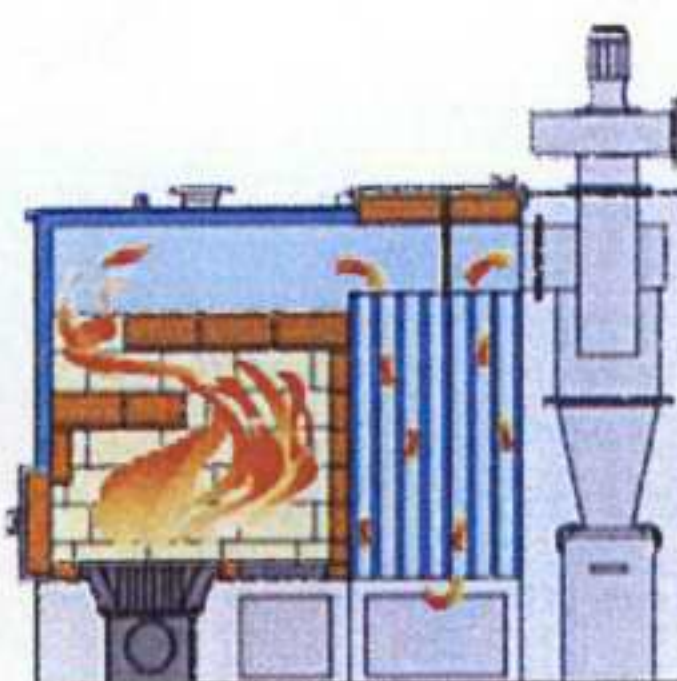
Combustion Chamber ①

At temperatures up to and in excess of 1000°C, materials are exposed to hostile conditions that have to be compensated for:

- The combustion chamber is completely lined with superior refractory brickwork and cooled by the boiler's water jacket.
- High-grade anti-scale/heat-resistant chromium cast steel alloy is used for grates and the boiler retort, which are aired from below with primary combustion air.

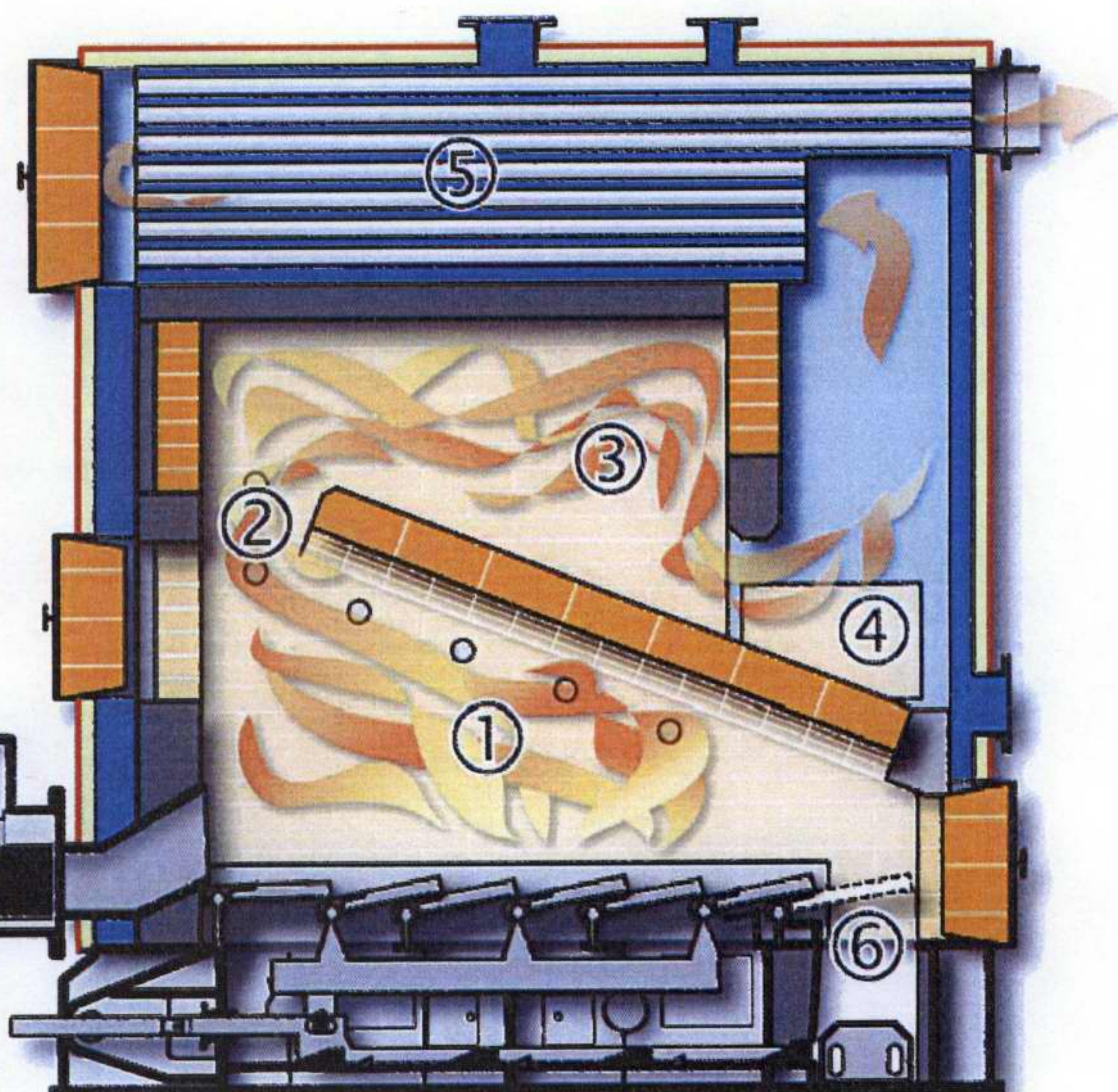


Years of experience in material selection and in designing the combustion chamber safeguard the boiler's longevity, even if operated with troublesome fuels.



Well Designed Heat Exchangers ⑤

- BINDER fire tube heat exchangers are highly efficient and 'fine-tuned' to your heating needs.
- Manual maintenance is almost eliminated through a fully automatic high-speed cleaning system*.
- A long life is guaranteed due to sturdy 5 mm thick tubes and optimum welding.



Automatic De-Ashing ⑥

- Fly ash and bottom ash are automatically conveyed into a detached ash container, using screw augers* or drag conveyors*, or
- Ash is collected in integrated containers. Depending on the fuel ash content this can be held for weeks or months.



Detachable ash-container* with a capacity of 0.15-1.5 m³ depending on the boiler size.

Know-how and Reliability



Part of the exhaust gas is returned to the heat exchanger and blown through the fire tubes at such a velocity that particles already deposited are removed and deposited in the cyclone.

Fully Automatic Cleaning System*

This feature provides high-speed de-ashing of the heat exchanger's fire tubes in frequent and preset intervals without interfering with normal operation:

- prevents the formation of deposits, thus maintaining a constant and efficient heat transfer,
- reduces the manual care to 1-2 basic de-ashing procedures per year,
- guards against boiler corrosion.

Capacity Control (Standard)

- Air supply and fuel inputs are coordinated to the actual heat demand using PLC control and Lambda O_2 regulation.
- When heat demand drops, the plant operates in part-load mode or it is shut down.

Capacity and Combustion Control (CVP Control Package*)

Features a fully modulating computer control with 3 interlinking loops that permanently assess the actual requirement of heat, adjust the fuel feed accordingly, and match it with the continuously variable air supply.

- Reacts dynamically to changes in the combustion process through the Lambda O_2 control which immediately adjusts the secondary air supply.
- Variable air volumes are automatically compensated by the integrated negative pressure control.
- Speed-controlled fans minimise electric power consumption.
- Renders an optimal efficiency over the entire output range of 25% to 100%.

Accumulator Tank Management*

The use of smart hot water tank systems works well with BINDER biomass boilers:

- Daily peak demands during full load periods are met through the accumulator tank.
- Heat demands during part-load periods are met through the boiler using modulating capacity control.
- In case the heat demand decreases further, the accumulator tank – now serving as the sole heat source – is loaded and then the boiler will be shut down.

Repeated starts and shut-downs are substantially reduced, which increases the boiler's lifetime and minimises air pollution.

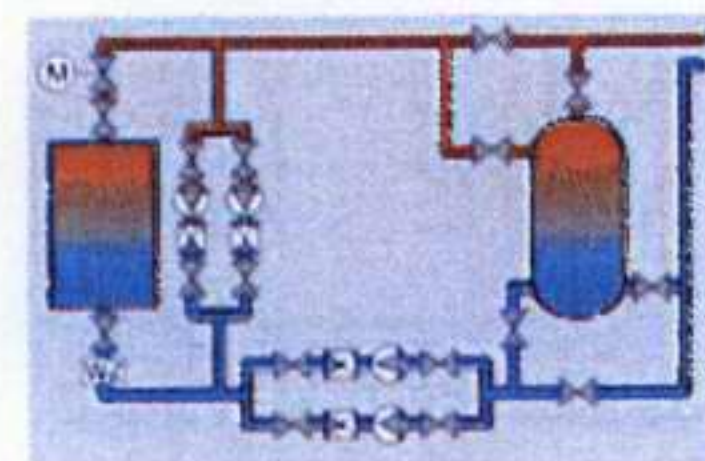
Industrial Large-Scale Systems

BINDER systems are available up to 20 MW_{therm} for the generation of process heat or for co-generation in CHP plants.

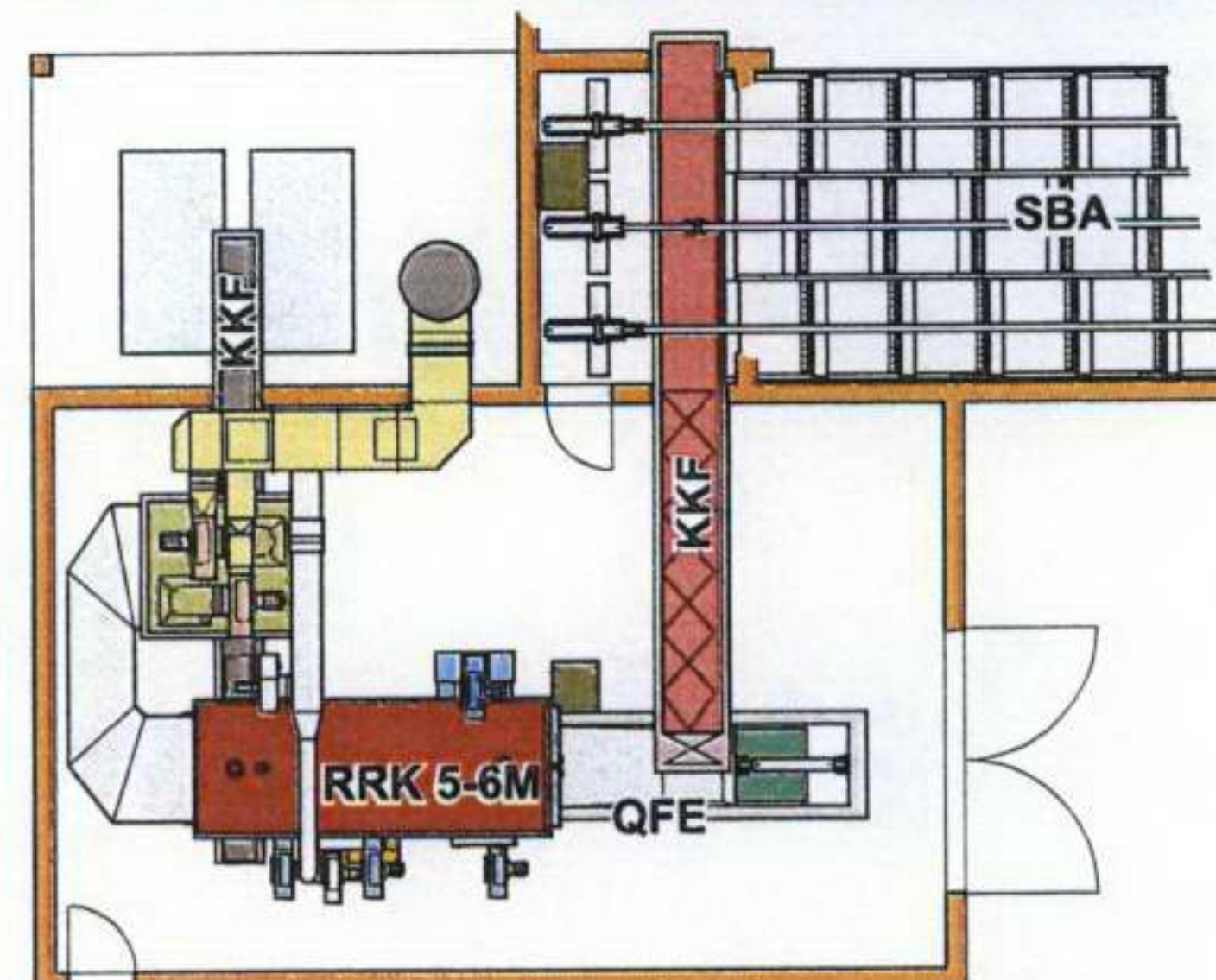
- Walking floors (SBA), drag conveyors (KKF) and hydraulic ram feeders (QFE) with integrated cutting edges can accept even the coarsest of fuels.
 - Even high-moisture fuels will be sufficiently pre-dried in a moving grate system.
- BINDER systems are therefore suitable for a wide range of low-cost fuels.



With the BINDER graphics package*, a computer terminal serves for the data input and display. The plant's parameters are monitored and displayed, and trend data for longer periods may be sampled and evaluated. The system can be linked via a modem to allow remote monitoring of the plant.



The integration of an accumulator tank – which may also be combined with solar heating – is perhaps the optimum efficiency heating concept, ideal for district heating systems. It also allows smaller capacity boiler plant to be used for the same peak load.



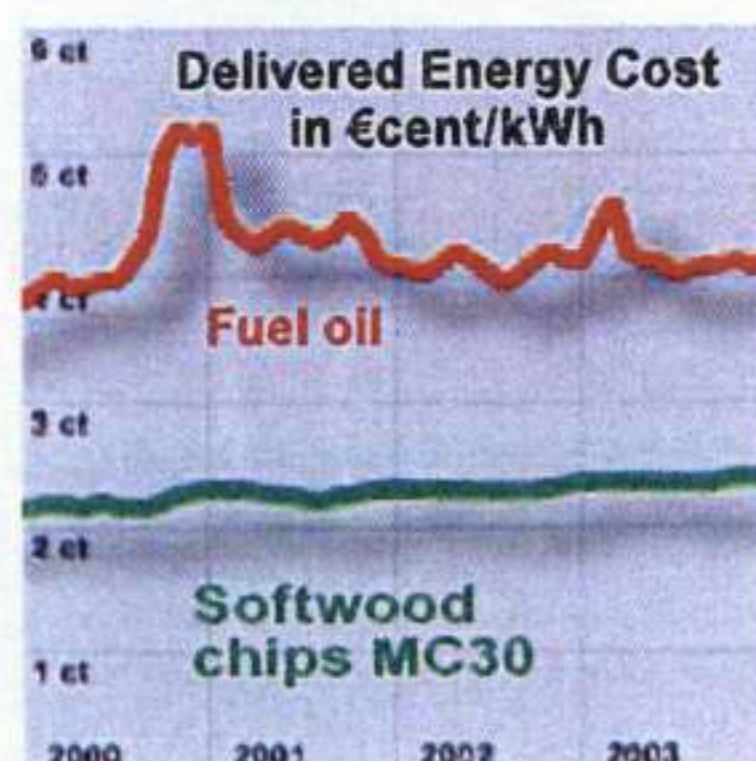
4 Good Reasons to Choose Biomass Heating

Cost-effective Heating for the 21st Century

State-of-the-art biomass systems are more capital intensive than conventional oil or gas fired equipment, though many countries now offer capital grants and other incentives, either from energy conservation programs or climate related initiatives.

However, because of lower fuel costs, this extra cost is often recovered in a short period of time – the higher your heating requirements, the quicker the payback period.

Whether your project is a district heating network, a hotel, the greenhouse business, or a residential care home: you are going to profit from low and predictable heating bills, independent from price increases and crises in other regions of the world.



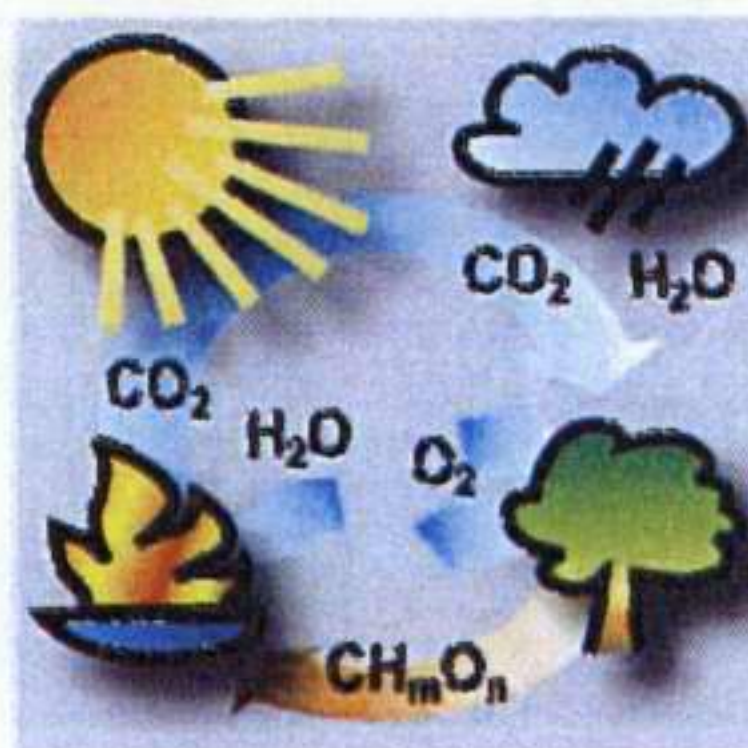
Fuel costs are about 30% to 40% lower than those for oil heating.

Source: Styrian Energy Advice Centre, Styrian Government/Agriculture, Austrian Energy Agency, ÖSTAT

Ecological Benefits

Even when your decision is solely founded on economics, you can also get the benefits of reducing carbon emissions:

- In the near future, carbon will have a value and will be traded on commodity markets.
- Biomass is a renewable source of energy that virtually grows just around the corner. It is energy crisis-proof, is locally available, and doesn't cause ecological disasters.
- Biomass supports and creates domestic job opportunities, increases buying power in your region and lessens our dependency on fuel imports.
- Biomass is the energy source of the future.



Biomass is "carbon-neutral", i.e. its combustion emits just that amount of CO₂ which has been previously absorbed from the atmosphere by photosynthesis.

Widespread Availability of Fuels

Whether it is sanderdust, forest residues, wood waste, bark or other biomass fuels – the by-products of your enterprise may contribute to reducing your heating bills, while reducing your disposal costs. Even wet materials, stored in the open can be used by BINDER boilers.

Even if you don't have your own source of fuel, biomass is usually available locally without high transportation cost.

Climate Protection Campaigns

As a local authority you may have committed yourself to implement the ideas and goals of sustainable development, deriving from "Local Agenda 21" or "Climate Targets".

Biomass heating systems are 'carbon-neutral' systems, replacing fossil fuels with a truly renewable fuel, and could make use of your waste from landscape management.

Heating your public facilities with biomass fuels is a cost-effective way of achieving carbon targets and may be persuasive to new housing and industrial developments.



What You Should Consider When Selecting a Biomass Heating System

- Make sure you size the boiler system to your needs. Oversized or undersized boilers are less efficient and have a shorter lifespan.
- To which extent can you guarantee a constant fuel quality with a good local supplier? Take care that the boiler is capable of a wide range of fuels, and that it comes with a compensating control like Lambda regulation.
- Check that the boiler system complies with local and national pollution limits. Eventually check your own fuel through laboratory sample firing.
- The materials in the hot sections of the boiler are exposed to severe stress. Therefore, scrutinise the quality and temperature limits of the refractory lining, the wall thicknesses, as well as the serviceability of parts. Complex solutions needn't be the most durable ones.
- Insist on visiting some reference plants and talk to their owners. Check your supplier's experience in the field of biomass combustion.



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Energy from biomass

25 Years of Experience



Josef jun., Stefanie, Josef sen. and Johannes Binder

The products we develop make sense from both an economic as well as ecological point of view. They are truly a technology that meets all the criteria for successful Sustainable Development. This is a principle we also follow in all our business activities:

- through honest, fair and long-term partnerships with our customers and suppliers
- through constant improvements in the systems we offer
- through the appreciation of staff initiative, team-playing and self-motivated employees
- through the resource-efficient manufacturing of products that have been designed for durability
- in the tradition of a family firm with solid growth and sound foundation. We don't aim at short-term profit, but long-term growth and sustained development.

We look forward to working with you and your organisation.

Josef Binder sen., Managing Director

Our sales partner close to you:



Made in Austria

On its two premises spread over 11 hectares and with 6.200 m² of shop-floor area, BINDER manufactures more than 200 boiler systems per year.

The cooperation with nearby university research facilities and related organizations, as well as the know-how of its high-skilled 100-plus employees secure the high technological standard of BINDER boilers.



Worldwide Service

With more than 3.000 boilers installed all over the world – from Canada to Russia – BINDER has become a major player in this field. Reliable service and maintenance is provided through our own service team headquartered in Bärnbach/Austria, and supported by 13 sales and service organizations in 11 countries.



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