





## BIOMASS BOILERS



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The definition of “biomass boilers” refers to all boilers and plants powered by fuels of organic origin: industrial and urban waste of plant or animal origin which can no longer be used, but which can be transformed into electricity and heat. According to the directive 2009/28/EC of the European Parliament, biomass means *“the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste”*.

The biomasses, and fuels that derive from them, represent a source of renewable energy because the carbon dioxide emitted during the combustion process is more or less the same as the one which the plants absorb during their life and release after their natural death. Therefore, the combustion of biomass does not lead to an increase of carbon dioxide in the atmosphere, main cause of the greenhouse effect, but rather it represents an additional benefit to the environment because of the biodegradability of the substances that are burned.

Our boilers are designed to burn common biomass fuels like wood waste chips and pellet, but also other organic waste, such as Pellet, wood chips, sawdust, briquettes, bark, chicken litter, horse litter, mushroom bed, miscanthus, nuts shell, peat, waste derived fuels, vine shoots, olive pomace, simple pomace, etc. For special fuels a chemical analysis is required; then we'll be able to design your required personal plant.

The disposal of industrial processing waste, significantly affects business costs. Biomass plants transform waste into a resource, obtaining electrical energy and heat resulting from their combustion.

The biomass plants we design are suitable for every type of industrial process complying with the updated pollution regulation. The boilers can be produced with “water jacket” technology, in reduced dimensions and higher efficiency, also available with adiabatic chamber. We offer and supply complete solutions, including storage/feeding, transport, combustion and smokes filtering system. We steadily follow and support our customers by each stage of the project from choosing the more suitable system to commissioning. The plant is normally divided between various sections.

The main ones are:

- 1. Storage silo**
- 2. Feeding system**
- 3. Boiler**
- 4. Combustion grate**
- 5. Filtering**
- 6. Chimney**

**STORAGE SILO**

The storage silo is the part of the plant where the biomass is stored and then moved and transported to the feeding system. We can realize different types of storage silo according to the fuel characteristics and customer's needs.

**FEEDING SYSTEM**

The biomass is transported from the storage silo up to the boiler and poured into the combustion grate through the feeding system. Usually the feeding system is compounded by one (or more) augers and/or a chain conveyor, designed to guarantee the right supply of fuel to the boiler. The system is designed in accordance with safety and fire prevention rules.

**BOILER**

Biomass boilers are compounded by a combustion chamber and a heat exchanger.

The combustion chamber, in which the combustion takes place, is equipped with fans for air addition and probes for the combustion parameters control. Combustion chambers can be adiabatic or water jacket designed.

The combustion, which take place on a fixed or moving grate, generates smokes that go into the heat exchanger and ashes as waste. The ashes can be either collected by automatic or manual devices. The heat exchanger uses the energy of the smokes for the production of hot water, superheated water, steam, etc., according to customer's request. All the safety devices and the automatic exchanger cleaning system are generally included in the supply

Our boilers can be produced and certified according to all the world rules (ASME, PED, etc.).



## COMBUSTION GRATE

The grate is the area where the combustion material is poured. The grate can be of 3 types:

- 1) Fixed
- 2) Flat moving grate
- 3) Inclined moving grate

The flat fixed grate is the simplest and cheapest one; it requires a regular cleaning of the ashes.

The moving grates are used for medium-large size boilers and they are equipped with devices for the automatic ashes extraction. This type of grate allows a better combustion process control, ensuring more efficiency.

## FILTERING

The smokes coming out of the heat exchanger must be cleaned and, generally, there are two methods used for this purpose (separately or together):

1. Cyclone (or multicyclone) filters for a first filtering which respect the main pollution regulations
2. Bag or electrostatic filters for a broader filtering action

## CHIMNEY

The smokes are expelled into the atmosphere by the flue after filtering. The expulsion is guaranteed by the presence of the ID fan which push the smokes through the chimney.

In a biomass plant other components may be present, depending on the fuel characteristics and customer requirements; a correct basic layout avoid future problems.





## INSTALLATIONS

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The use of biomass has ancient origins. Wood has always been burned to warm up and to cook. The individual consumption today has been developed on a large scale, entering the most varied industrial applications.

Modern power plants are able to utilize the energy contained in biomass to produce hot water, superheated water, steam and electricity, diminishing the environmental impact compared to non-renewable energy sources.



**HOT WATER**

Hot water boilers are used for temperatures below 110/115°C; these boilers are mainly used for the centralized heating of hospitals, greenhouses, industrial sites, etc. The hot water systems are generally more favorably accepted in comparison with others system thanks to their simplest management.

**SUPERHEATED WATER**

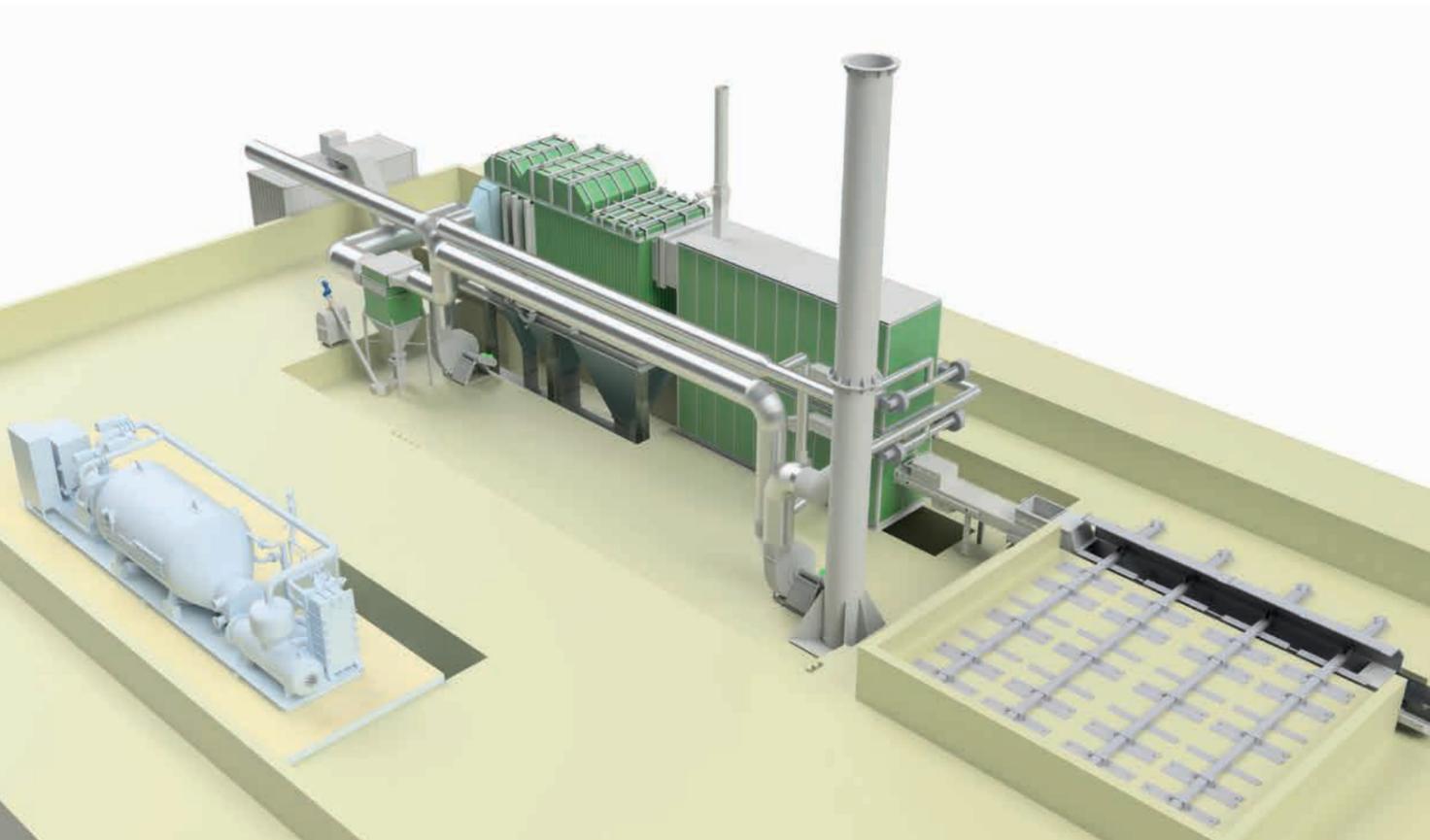
These boilers are used for temperatures above 110/115°C. They are mainly used in the district heating sector and in specific industrial applications (food, manufacturing, etc.). This type of system is also applicable in cogeneration plants.

**STEAM**

Our range of biomass boilers includes steam generators (saturated or superheated). The applications range varies from industrial sector (food, pharmaceutical, etc.) as well as to the production of electricity through steam turbines.

**COGENERATION AND TRIGENERATION**

Cogeneration is the simultaneous production of electricity and heat, with additionally the production of cold we obtain the trigeneration process. We can produce and deliver cogeneration plants (trigeneration) turnkey.



**BOILERS**

MODEL	TYPE	MINIMUM POTENTIAL	MAXIMUM POTENTIAL
GPT - AC	Fire tube, 3 passes, hot water production	900 kW	9,000 kW
GPT - AS	Fire tube, 3 passes, heater water production	900 kW	9,000 kW
GPT - CP	Fire tube, 3 passes, steam production	1,000 kg/h	12,000 kg/h
GPT - HA	Fire tube, 3 passes, hot air production	400 kW	1,500 kW
GPT - PW	Cogeneration	50 kWe	5,000 kWe

STANDARD BOILERS DATA	DESIGN PRESSURE	BOILER ROOM DIMENSIONS (MM)				PERFORMANCE	MAX WEIGHTS WITH WATER (KG)	
		GRATE GF-P	GRATE GF-M30	GRATE GM-M30	GRATE GM-M50			
1200	6 bar 10 bar	GPT/AC	8,000x5,000 H.4,200	9,000x6,000 H.4,500	9,000x6,000 H.4,500	9,000x6,000 H.5,000	1,200 kW	18,800
		GPT/AS	8,000x5,000 H.4,350	9,000x6,000 H.4,650	9,000x6,000 H.4,650	9,000x6,000 H.5,150	1,200 kW	18,800
		GPT/CP	8,500x6,000 H.5,880	8,500x6,000 H.5,880	9,000x6,500 H.5,960	9,000x6,500 H.6,520	1,860 kg/h	23,800
1650	6 bar 10 bar	GPT/AC	8,500x6,000 H.4,200	8,500x6,000 H.4,500	9,500x7,700 H.4,500	9,500x7,700 H.4,800	1,650 kW	26,100
		GPT/AS	8,500x6,000 H.4,350	8,500x6,000 H.4,650	9,500x7,700 H.4,650	9,500x7,700 H.4,950	1,650 kW	26,100
		GPT/CP	9,500x7,000 H.6,420	9,500x7,000 H.6,420	9,500x8,000 H.6,500	9,500x8,000 H.7,100	2,560 kg/h	30,800
2100	6 bar 10 bar	GPT/AC	10,000x7,500 H.4,600	10,000x7,500 H.4,900	9,500x8,500 H.6,000	9,500x8,500 H.5,700	2,100 kW	35,800
		GPT/AS	10,000x7,500 H.4,750	10,000x7,500 H.5,050	9,500x8,500 H.6,150	9,500x8,500 H.5,850	2,100 kW	35,800
		GPT/CP	9,500x8,000 H.7,145	9,500x8,000 H.7,145	9,500x9,000 H.8,270	9,500x9,000 H.8,270	3,255 kg/h	43,300
3000	6 bar 10 bar	GPT/AC	11,000x8,500 H.5,500	11,000x8,500 H.5,800	11,000x8,500 H.5,800	10,500x8,500 H.6,947	3,000 kW	50,800
		GPT/AS	11,000x8,500 H.5,650	11,000x8,500 H.5,950	11,000x8,500 H.5,950	10,500x8,500 H.7,097	3,000 kW	50,800
		GPT/CP	11,000x9,000 H.8,200	10,500x9,000 H.9,450	10,500x9,000 H.9,530	10,500x9,000 H.9,450	4,650 kg/h	60,000

**ALSO AVAILABLE THE FOLLOW SPECIAL MODELS:**

- Performance 5,000 kW 7,750kg/h
- Performance 7,000 kW 10,850 kg/h
- Performance 9,000 kW 12,000 kg/h

Standard design pressure from 6 bar to 25 bar. - Higher design pressures available upon request. For any requests of special designs and applications extra from those included in the catalogue, a feasibility analysis must be executed.

**GRATES**

MODEL	TYPE	MINIMUM POTENTIAL	MAXIMUM POTENTIAL
GF - P	Fixed grate for pellets	900 kW	3,000 kW
GF- M30	Fixed grate for wood chips humidity up to 30%	900 kW	3,000 kW
GM - M30	Moving grate for wood chips humidity up to 30%	900 kW	9,000 kW
GM - M50	Moving grate for wood chips humidity up to 50%	900 kW	9,000 kW

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