



Membre de l'UICN, Union Internationale pour la Conservation de la Nature

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Technical description of CarboChar for Biochar production

This new machine is characterised by a fluid flow system and a more efficient heat transfer than the previous Pyro-6F, and achieves better yields and energy production.

Other highlights are the CarboChar maintenance cost is very low thanks to new mechanical components. Skid mounting on chassis allows it to be transported in container 20' or 40' according to the model. Also, assembly and commissioning on the operating site only requires 8 hours.

CarboChar-1

With an average biochar production capacity of 40 kg per hour, depending on the biomass used. For electrical consumption only 10 kW and 5 to 7 litres of fuel for preheating is needed. This model can be embedded on a trailer in order to be easily moved from site to a site with a tractor or a truck.



Minimum space: 4 m x 7 m and 2.5 m high

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Innovation Towards Sustainable Development

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CarboChar-2

Its maximum production capacity is 120 kg / hour of biochar and for electrical consumption only 15 kW is needed and 20 litres of fuel for preheating.

Minimum space: 5 m x 10 m and 4 m high

CarboChar-3

Its maximum production capacity is 200 kg / hour of biochar and for electrical consumption only 20 kW and 35 litres of fuel for preheating.

Minimum space: 7 m x 15 m and 5 m high

Technical details

Feeding system

With the exception of CarboChar-1 that has a 0.3 m³ hopper connected directly to the rotary valve, the CarboChar-2 and 3 are fed by a screw with a length of 2.5 m, including also a rotary valve.

Construction uses black coated steel with 2 coats of anti-rust paint.

Raw-material to be processed:

- Nature: biomasses with a maximum humidity of 15%
- Particle size: 2 to 20 mm
- Density: preferably up to 200 kg / m³

The control group consists of a rotary valve driven by the gear-motor retorts screws

Carbonisation and combustion chambers

They are respectively used to transform the dry biomass into biochar and to recycle and burn pyrolysis gases to ensure the continuous operation of the machine.

Operating temperature: 400-550°C and 900-1100°C.

Construction is refractory steel Type 310 for the retorts and boiler steel with high temperature protection ceramic for the body. The baffles are made of stainless steel 304 L. The thermal insulation is made of ceramic fibre cloth. The combustion chamber is coated with insulating micro-porous and high temperature refractory concrete.

The control group is composed of a gear motor, a fuel burner and a dilution fan. The measurements of the parameters are done with two type K thermocouples and two pressure sensors.

Chimney

This heat exchanger will preheat the combustion air through the smoke. It is made of stainless steel 304 L.

The control group is composed of a centrifugal fan with variable frequency in order to regulate the air-flow.

Equipped with a fume extractor with frequency converter, it ensures the evacuation of the combustion gases by controlling the vacuum in the machine. It is made of stainless steel 304 L.

Cooler of Biochar

This heat exchanger, mounted only on the CarboChar-2 and 3, has a double wall with baffles and a screw driven by a geared motor for the transport of biochar. Downstream from this exchanger, we have a rotary valve to ensure the tightness of the pyrolysis system.

The heat transfer fluid that is water-cooled in a closed circuit by a battery to two or four fans. The monthly consumption of water is 1 m³.

Control system

The control is done by a control system PL Unitronics 12". Six thermocouples and two pressure sensors are connected to this controller for the control and regulation of the operation of the machine.

Electricity supply

The electrical power on the site should be at least 50 KVA with 380 V and 50 Hz.

It is possible to co-generate with a steam turbine 1.5 MW when using 2 CarboChar-3 in parallel.

Water

A presence of a water supply to 4 bars minimum and a hose of 50 m is required in case of accidental fire.

Heat produced by the CarboChar

Our technology that emits no greenhouse gases and consumes very little power is also generating 45% of the heat produced as cogeneration. It is 120 kW for CarboChar-1, 480 kW for CarboChar-2 and 1 MW for CarboChar-3.

Electricity produced by steam turbine

With an installation consisting of 2 CarboChar-3 in parallel, it is possible to produce 1.5 MW using the co-generated heat.