

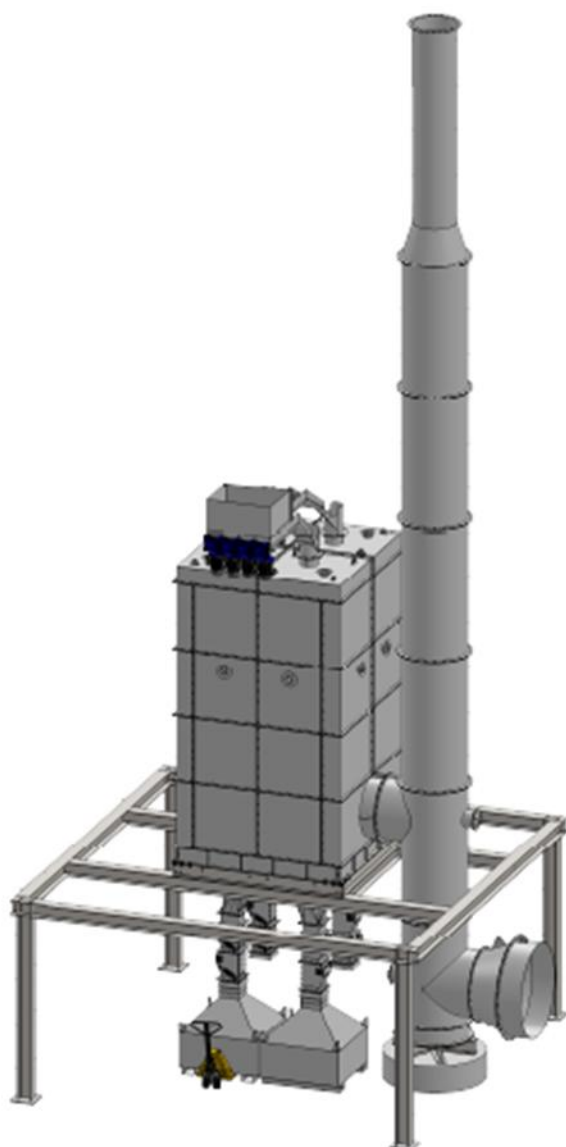
FACT SHEET

Equipment:	Adsorb Biomass Converter	No. of pages:	2
Model:	ABC04	Revised:	14 April 2025

1. GENERAL DESCRIPTION

An Adsorb Biomass Converter (ABC) may best be described as a combustion hybrid technology that converts biomass into two products i) activated carbon and ii) clean thermal energy. The graphic below illustrates the four (4) chamber model, an ABC04.

Biomass is fed into the converter by way of four live bottom screws, each one feeding an independent internal chamber via a feed hopper.



The biomass is first carbonized then steam activated (by way of water injection at the base of each chamber) before being discharged as activated carbon by way of four (4) independent floor ports. The producer gas generated from carbonization and activation is continuously fired to maintain the activator above 1000°C. Combustion is carefully controlled to deliver a clean flue gas ideal for heat recovery. By “clean” we mean the flue gas meets air emission quality standards for biomass combustion without any further need for treatment. The high temperature flue gas above 1000°C is directed by way of a refractory lined duct, doubling as an emergency dump stack, to a heat recovery system e.g. hot water boiler. The converter is elevated to facilitate gravity discharge of the hot activated carbon into four (4) cooling bins positioned directly beneath the activator. The converter operates under negative draw by relying on either natural draft by way of the dump stack or induced draft by way of a stack fan fitted to the energy user. Combustion air enters through the feed hoppers located on the roof. Combustion is controlled according to the free oxygen level in the stack. A stack fan driven by way of a variable speed drive ramps or slows according to the free oxygen level set point of 10%. This delivers good combustion efficiency and compliant air emissions. The converter is started by “firing” dry biomass in each chamber and relying

on combustion to heat the converter above 1000 °C. Once at temperature the converter is switched to continuous production mode.

The technology is protected by way of license.

2. TECHNICAL INFORMATION

Below are general specifications of a four (4) chamber Adsorb Biomass Converter, model ABC04. For illustration purposes capacity parameters are provided for the processing of wood.

General specifications:

Model	ABC04	
Furnace height	4860 mm	
Furnace length	2710 mm	excluding stack
Furnace width	2630 mm	
Furnace load	30 tons	approximately
Maximum moisture of wood feed	38 wt%	
Maximum flue gas temperature	1200 °C	controlled
System height	8920 mm	excluding dump stack
System length	4350 mm	including dump stack
System width	2826 mm	

Capacity parameters:

Moisture content of wood feed	15 wt%	assumed
Net calorific value of wood feed	16.8 MJ/kg	calculated
Wood processing rate	888 kg/hr	calculated
Wood thermal energy	4.2 MW _t	referenced to 0°C
Activated carbon production	80 kg/hr	specified
Activated carbon yield	9.0 wt%	calculated
Flue gas mass flowrate	7527 kg/hr	calculated
Flue gas volumetric flowrate	29683 Am ³ /hr	calculated
Flue gas temperature	1100 °C	calculated
Flue gas free oxygen	10 vol%	controlled
Flue gas thermal energy	3.3 MW _t	referenced to 0°C
Heat recovery potential	2.4 MW _t	referenced to 0°C

3. REFERENCE PLANT

Adsorb has been operating an ABC04 at its Brakpan facility since April 2024. This facility is open for viewing. It is conveniently located to OR Tambo Airport which is only 30 km away or 30 minutes by car.

