

btg-btl

biomass-to-liquid



pyrolysis oil, the sustainable alternative

Pyrolysis Oil, the Sustainable Alternative

Pyrolysis oil is a clean and uniform liquid that can be used as a sustainable alternative to fossil fuels for the production of renewable energy and chemicals. It is obtained through a process called fast pyrolysis, which transforms biomass into a liquid.

As a technology supplier BTG-BTL delivers the engineering package, plant automation and the core components for pyrolysis plants. Other plant components and auxiliaries are sourced locally. BTG-BTL strongly believes in cooperation models involving local partners. Working with local partners helps to ensure full consideration of local regulations, standards and safety requirements. BTG-BTL will work together with (EPC-) partners when turn-key delivery is requested.

Service and maintenance contracts, including remote monitoring of the pyrolysis plant, are also part of the BTG-BTL supply package.

A wide range of biomass feedstock

In the last few years, BTG-BTL has tested more than 45 different kinds of biomass feedstock including wood, rice husk, bagasse, sludge, tobacco, energy crops, palm-oil residues, straw, olive residues, chicken manure and many more. BTG-BTL is always interested in broadening the range of suitable feedstock for producing pyrolysis oil.



Pyrolysis oil characterized (wood derived)

Composition	$C_2H_5O_2$
Density	1150 - 1250 kg/m ³
Higher heating value	17 - 20 GJ/m ³
Water content	15 - 30 wt. %
Viscosity	25 - 1000 cP
Ash	< 0.1 wt. %
Acidity (pH)	2.5 - 3

The BTG-BTL pyrolysis process



- (1) BTG-BTL's fast pyrolysis technology is based on intensive mixing of biomass particles and hot sand in absence of air in a modified rotating cone reactor. Pyrolysis oil, char and gas are the primary products from the process.
- (2) The charcoal and the sand are recycled to a combustor where the charcoal is burned to reheat the sand.
- (3) The vapours leaving the reactor are rapidly cooled in the condenser yielding the oil and some permanent gases.
- (4) The permanent gases and the surplus heat from the combustor can be used to generate steam for power generation, biomass drying or external use.

A compact, competitive, convenient and versatile technology

Converting biomass into pyrolysis oil offers several advantages:

- > Pyrolysis oil is easy to store and to transport. Pyrolysis enables the decoupling of biomass supply and biofuel demand.
- > Application of liquid biofuels such as pyrolysis oil is easier and more convenient than that of solid biofuels. Today, it is possible to use pyrolysis oil in existing oil boilers.
- > Pyrolysis oil can be made from virtually any biomass feedstock, in particular residues. Applying biomass pyrolysis does not interfere with the food chain. Fast pyrolysis is a second-generation biomass technology.
- > Demand for pyrolysis oil, a greenhouse gas neutral biofuel, is large and increasing.
- > The minerals contained in biomass stay behind in the ashes. They can be reused locally, thus avoiding mineral depletion.

The BTG-BTL pyrolysis reactor concept involves rapid mixing of biomass and hot bed material. No inert carrier gas is used. This results in reduced system complexity and minimum down stream equipment size.

Typical characteristics of commercial units

Feedstock

Particle size < 10 mm

Moisture content < 10 wt. %

Capacity 1 - 5 ton/hr

Pyrolysis oil yield 50 - 70 wt. %



Today pyrolysis oil can be used in oil and gas boilers; more applications are on their way

Pyrolysis oil can, or will, be used for a range of applications, including:

- > Heat
- > Power
- > Transport fuels
- > Chemicals

The current focus is on **boiler applications**. Typical boiler size ranges from 1 MW to 20 MW.

Pyrolysis oil combustion in a boiler or furnace for **heat** and/or **electricity generation** is the most simple and straightforward application. Pyrolysis oil can replace (heavy or light) fuel oils and natural gas in industrial boiler applications.

Promising research is ongoing at BTG and elsewhere around the world to render future pyrolysis oil applications economically attractive. Research activities are focused on:

- > Use of pyrolysis oil in diesel engines and gas turbines for **power** production
- > Upgrading of pyrolysis oil to **automotive fuels**
- > Development of processes to extract high-value **chemicals** from pyrolysis oil



BTG's first commercial pyrolysis plant built for a customer in Malaysia (Capacity: 2 ton/hr)

BTG-BTL is the partner you need

To commercialize its biomass pyrolysis technology BTG Biomass Technology Group established **BTG BioLiquids B.V.** (trade name **BTG-BTL**) in 2007. BTG, one of the pioneers in pyrolysis, started its fast pyrolysis developments in the early 1990s. Over the years, BTG has constantly improved its pyrolysis technology, developed innovative solutions and registered several patents. BTG-BTL fully enjoys BTG's experience and know-how to build high quality pyrolysis plants.

For more information about our technology and our company, please visit our website: www.btg-btl.com



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