Gasification System: Process Flow

Description

The Gasifier is a downdraft biomass gasifier that allows the user to create syngas that can be used to run an engine or generate electricity. Figure 1 shows a profile diagram that identifies the material and gas flow in the gasification system.

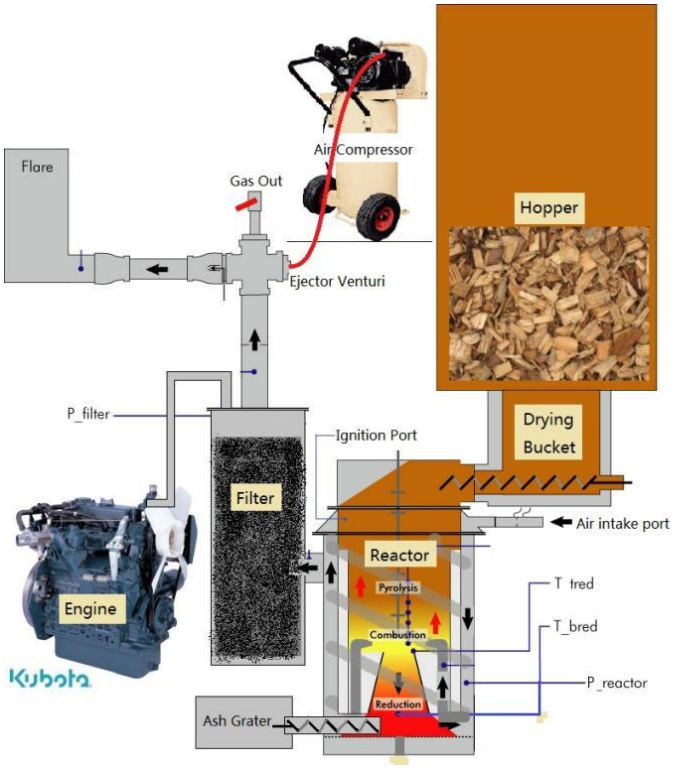

Figure 1: Profile Picture of the Gasification System

Process Flow

1. Once the hopper is filled with biomass fuel, close the lid on top to seal the whole system.
   - An air compressor is connected to the ejector Venturi to form a negative pressure inside the system.
   - The biomass is continuously fed into the reactor by the feeding auger.
   - Controlled by the fuel level switch, the auger does not stop until the reactor is filled with biomass fuel. After being ignited, the biomass in the reactor goes through a drying, pyrolysis, combustion, and reduction processes.
2. The air inlet is opened to allow air to enter the combustion zone.
   - After this process is completed syn-gas is produced and comes out of the reduction zone at the bottom of the reactor.
3. The syn-gas then flows around the drying bucket for heat exchange, through the cyclone and filter for particles, moisture and tars removal.

The syn-gas output can flow three alternative ways:

- To the flare stack for test burning,
- To the generator head to fuel the internal combustion engine
- To the gas out port for sampling.