Gasification System

Related Instrument Procedures

- Feeding System
- Gasifier Reactor
- Gas Flow System
- Gasifier Control Unit
- Gasifier Process Flow

Description

Biomass fuels are gasified in a laboratory scale gasification system using a Gasifier Experimenter Kit (GEK) manufactured by All Power Labs as show in Figure 1.

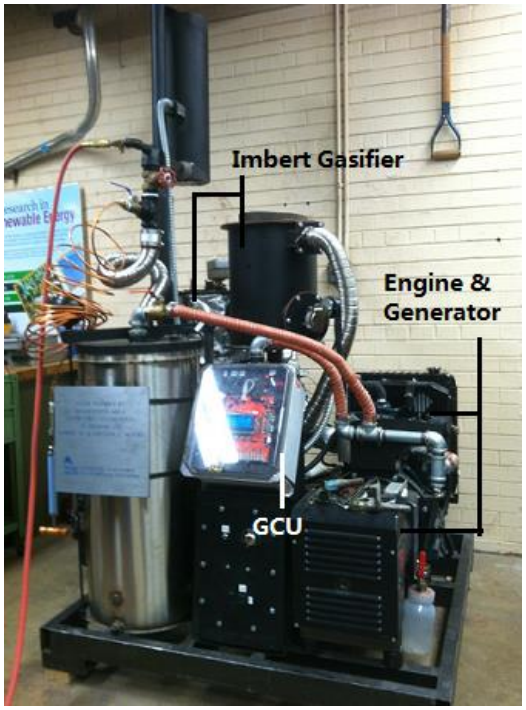

Figure 1: GEK Gasification System - Gasifier, GCU Engine and Generator

This is a complete biomass power generation solution that realizes the automatic conversion from solid biomass to electricity. This system consists of three parts:

1. A multi-stage downdraft Imbert gasifier that can gasify certain types of biomass fuels and produce combustible syn-gas. The design of the "tower of total thermal integration" (TOTTI) in this gasifier helps recycle and reuse "waste heat" from the reactor and engine exhaust to heat up the drying bucket and pyrolysis zone.

2. A Gasifier Control Unit (GCU) that can monitor and display temperature and pressure inside the system at different spots. At the same time, through the automatic control of the auger and grate system, the GCU also guarantees the material and gas flow of the whole system;
3. A 10kw generator driven by a 922cc Kubota engine fueled by the syn-gas.
4. The key objective of using this gasification system is to produce syn-Gas using only the gasifier and GCU parts were involved in experiment. Figure 2 shows a front view of this system.

Figure 2: Front View of Gasifier.