

Gasifier Control Unit

Associated Procedures

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

Description

The GCU contains controller switches for the ash auger and feeding auger, one LCD display for pressure and temperature readings as well as feeding auger working condition, and an oxygen sensor to control and adjust air/syn-gas ratio for the engine as shown in Figure 1.



Figure 1: Gasification Control Unit

The GUC displays the temperature on top of reduction bell (T_{tred}), temperature on bottom of reduction bell (T_{bred}), pressure of combustion zone (P_{comb}), pressure of reactor (P_{reac}), pressure of filter (P_{filt}), pressure ratio (P_{rati}), and auger condition. The temperature readings are detected by thermocouples and

pressure readings are tested by pressure sensors. These readings provide a good understanding and monitoring of critical reaction zones (combustion and reduction). Therefore, most of the sensors are located at the reduction bell area as shown in Figure 2.

The Temp 1 near hearth restriction measures the combustion temperature and is displayed by the GCU as T_{tred} in Celsius. The Temp 2 at the bottom of reduction bell measures the reduction temperature and is displayed by the GCU as T_{bred} also in Celsius.

The Pressure 1 displayed as P_{comb} measures the pressure drop over the nozzles while the Pressure 2 displayed as P_{reac} measures the pressure drop across the whole reactor. The unit for the pressure is tenth of inches of water. For example, a reading of 10 means 1 inch water of pressure.

The reading of P_{rati} refers to the ratio of P_{comb} and P_{reac} ($P_{\text{comb}}/P_{\text{reac}}$). This is critical for material flow in the reactor since it sends out the order of shaking the grate shaker when the ratio is out of normal range (30~60). P_{rati} smaller than 20 indicates too much charcoal in the reduction zone. Thus, a shaking of the grate can mitigate this situation.

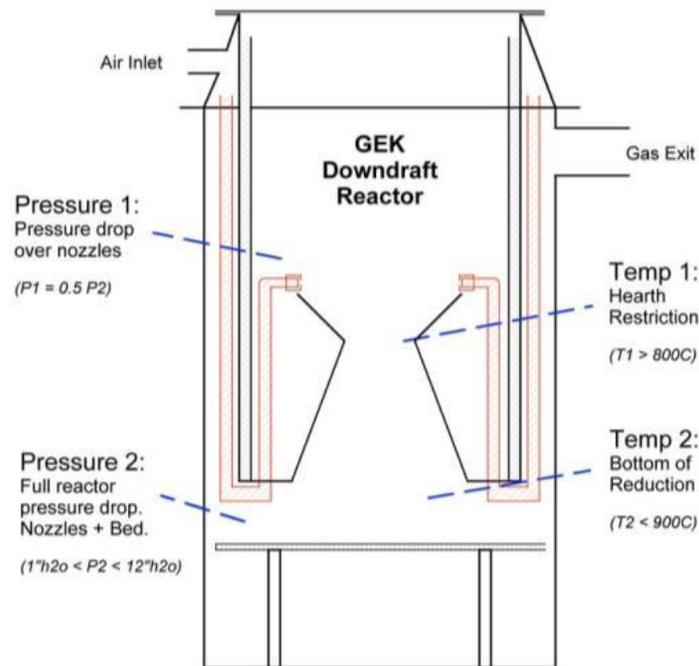


Figure 2: Schematic of Gasifier Reactor