

SECTION 1 - OPERATING INSTRUCTIONS

1.4.1 Air/Fuel Ratio (Carburetion)

A vertical feed, water-jacketed wood loading tube inhibits burning of the fuel charge in the loading tube and exposes only a 305 mm (12 in.) section of the wood to the burning process. Gravity feeding of the fuel to the combustion zone assures a relatively constant amount of fuel entering this defined area at any one time. Combustion air enters the combustion chamber at 152 mm (6 in.) of static pressure striking directly on the burning sticks, removing ash and scale as it forms. This ensures that new fuel is constantly being exposed to the combustion process.

1.4.2 Temperature

By separating the combustion process from the heat exchange area and insulating the combustion zone, temperatures required for the ignition of volatile gases are maintained throughout the combustion zone. The insulating cement surrounding the combustion zone holds the heat in this area. Actual combustion zone temperatures have been measured in the range of 650-1010 degrees C. (1200-1850 degrees F.), dependent on the moisture content of the wood being burned.

In the Jetstream design the heat exchanger fire tubes sit on top of the high temperature tunnel and gain the benefit of radiant energy. Since complete combustion has taken place before the hot gases leave the tunnel, quenching of the combustion process does not occur.

1.4.3 Turbulence

A jet of air enters the combustion zone through the stainless steel air tube. The geometry of the combustion chamber and the interference of the fuel on the path of air entering this chamber creates a turbulent zone within the combustion area. This process thoroughly mixes the gases released during pyrolysis with a metered amount of oxygen.

1.4.4 Time

Under the conditions of temperature and turbulence, and given the air/fuel ratio in the Jetstream, a certain residence time is required to allow the reaction to run to completion.

A refractory tunnel leads from the Jetstream combustion zone to the heat exchanger. During steady state operation this tunnel glows