

## Heat Transfer

### What Did We Measure?

- We measured the temperature of the air starting initially at a height of 0 m (in flames of fire) and continued to take measurements at intervals of .1524 m until a height of .9144 m was reached.

### What Can We Do With It?

- With these measurements, we get a sense of the heat profile above the kiln.

### What Does That Tell Us?

- These measurements tell us how much heat dissipates with height so we can understand how much heat we will have for our dryer at different heights.

### What Is Our Plan Moving Forward?

- Moving forward, we want our dryer to be as close to the flames as possible.

### What Did We Measure?

- We measured temperatures in intervals through the entire burn.
  - Thermocouples on inside of box, bottom surface of plate, and ~6in below the box
  - Box was empty until the last 15mins of the test

### What Can We Do With It?

- We can use these temperatures to calculate volumetric flow rate. We can also see if we need to change the height of our dryer or the design to achieve the ideal temperature.

### What Does That Tell Us?

- These temperatures tell us how much heat is inside the dryer and how much the temperature inside the dryer varies. By taking the temperature of the plate, we can see how much of the heat from the plate transfers to the air inside the dryer.

### What Is Our Plan Moving Forward?

- Our data indicates that we want higher temperatures inside our box. Moving forward, we want our dryer to be as close to the flames as possible.

## Fluid Dynamics

### **What Did We Measure?**

- We measured the volumetric air flow rate into the dehydrator box.

### **What Can We Do With It?**

- We can optimize the time the leaves take to reach the desired moisture content level. We can also verify these measurements with our calculated flow rate measurements.

### **What Does That Tell Us?**

- From our measurements we can see that we do not have enough air flow into the box. Also by comparing our test results with the calculated values, we have concluded that our method of measuring flow rate was not accurate.

### **What Is Our Plan Moving Forward?**

- We can increase the size of our air intake, specifically the diameter of the intake pipe. We can also try to minimize the angle of the bend in our intake pipe. We can add a secondary intake pipe to the system or increase our chimney height.