

# MET 466 – Thermal Processes Lab

## LAB #1 Thermal Conductivity Lab

Assigned: January 23, 2009

Due: February 5, 2009

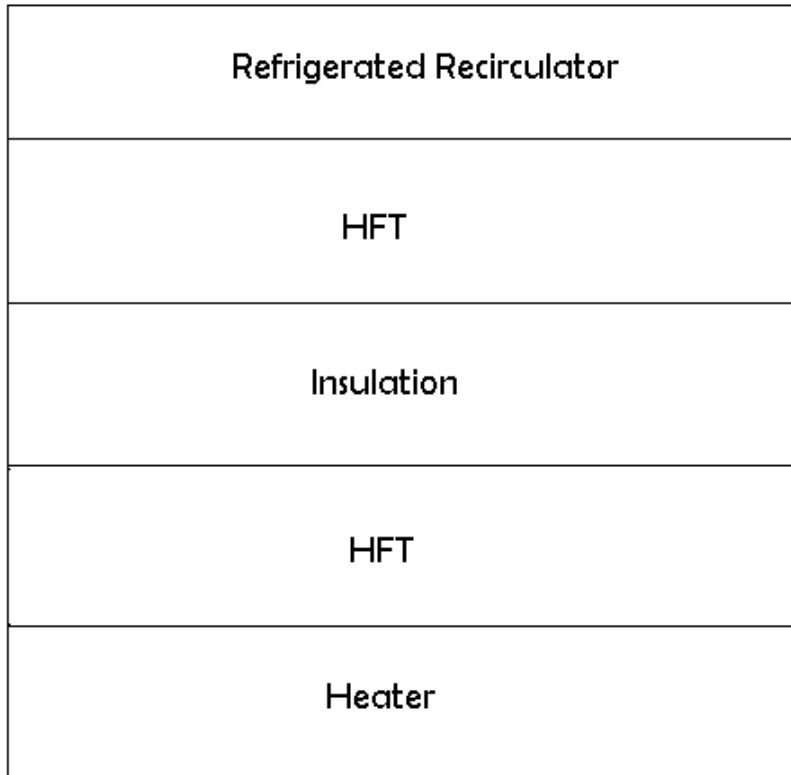
### **Procedure** (Performed Prior to Lab)

#### Running a Test:

- 1) Loosen and move the t-slot adjustable side guards with a 9/16" socket wrench.
- 2) Register the sample against the fixed sides and squeeze it into position with the adjustable side guards. Check for any gaps between the side guards and the sample to ensure good surface contact all the way around.
- 3) Tighten side guards.
- 4) Place the HFT/spacer plate over the sample with the HFT side down. Ensure that the edges line up with the sample and take extra caution with the fragile lead wires of the HFT and thermocouple.
- 5) Place the heat exchanger over the HFT/spacer plate ensuring the edges are lined up and square.
- 6) Guide the pressure plate over the four all-thread posts; this gives good contact between all components of the assembly.
- 7) Turn on data acquisition unit and PC. Open data logger software. Setup program to record the two temperatures and flux.
- 8) Turn the source heater variac transformer on. For a one inch sample turn amperage up to approximately .75 amps for a temperature of around 120 degrees Fahrenheit.
- 9) Turn on refrigerated recirculator to 10 degrees Celsius.
- 10) Run test until steady state temperatures and heat flux values have been reached.
- 11) Save data by exporting from Data Logger Program.

#### Shutdown Procedure:

- 1) Turn the power off to refrigerated recirculator.
- 2) Turn the power off to the source heater
- 3) Turn the power off to the data acquisition unit and PC.

**Schematic:**

-Thermocouples located below the Refrigerated Recirculator and above the Heater.

-Flux sensors located in both HFTs.

**Useful Data and Equations:**

-HFT Top Sensitivity: 4.11 Btu/hr-ft<sup>2</sup> mv.

-HFT Bottom Sensitivity: 4.34 Btu/hr-ft<sup>2</sup> mv.

**Results**

- Calculate U and R values of the test material.
- Compare experimental values to factory specifications for the test material.
- Discuss the difference between the experimental and the factory values and the possible reasons for the error.
- Discuss the difference between the two heat flux values.