

TA INSTRUCTIONS FOR THE CONDUCTIVE HEAT TRANSFER LAB

Ch En 385 – Knotts

Overview

- Students should spend about 1 hour in the lab. Part of this will be doing experiments, but make sure they are answering the analysis questions during waiting periods.
- The apparatus will require at least 3-4 hours to approach steady state temperatures. Coordinate with the lab manager if you are unable to come in that far ahead of time to start the apparatus.
- Before operating the equipment alone, you should have passed it off with either Dr. Knotts, Will Davis, or Mike Beliveau.

General Instructions

1. Do the following to prepare for students.
 - a. Learn how to run the equipment and pass off your understanding with either Dr. Knotts, Mike Beliveau, or Will Davis.
 - b. Perform the experiments that the students will do.
2. You should have set up specific times (5 hours a week) for students to perform the experiments. You will be in the lab during these times.
3. You will setup the apparatus before each lab hour following the instructions below.
4. After students are finished with the lab, you will shut down the apparatus following the procedures below.
5. You can grade assignments when in the lab and not answering student questions; however, you should be closely monitoring the students.
 - a. Keep them on task.
 - b. Ask questions to deepen understanding.

Apparatus

Figure 1 is a picture of the apparatus. Notice the following.

- There are 8 different cases, in total. Six of them are with the tops exposed to stagnant air, the other two have a fan blowing air over them to for convection at their surfaces.
- In order to read the temperatures from the attached thermocouples, a laptop must be connected via the USB cord. Figure 3 shows a screen capture of the interface which will be used to view the temperature data. The toggle switches will display or hide the temperature readouts. The application to run this may be downloaded from:

<http://walk->

[inlab.groups.et.byu.net/ChEn_385/ConductionCart/ConductionCartA.exe](http://walk-inlab.groups.et.byu.net/ChEn_385/ConductionCart/ConductionCartA.exe)



Figure 1 Conductive Heat Transfer Apparatus 1

Set Up of the Starting Configuration

Do the following, **before students arrive**, if not already done.

- Make sure the apparatus has been running for several hours prior to the lab time. To turn on the heater, flip the switch on the heater control switch (shown in Figure 2) to the “On” position.
- The heater should be left on the setting designated by the arrow on the heater control switch, as shown.
- Connect the laptop via the USB cable from the cart and run the interface application to check the temperatures.
- Make sure to hide all of the temperature readouts before students arrive so they can think through the worksheet before having any data.



Figure 2 Heater control switch

Lab Operation Procedures

- Students will start the lab worksheet before looking at any data from the apparatus. Steps 1 and 2 of the worksheet will be done without your help and they will pass it off with you once they have completed it.
- When they are ready to move on to step 4 of the worksheet, you will help them open up the computer interface to read the temperatures.

Shutdown Procedures

- Once students have recorded the temperature data in the worksheet, shutdown the interface application.
- If no other sections will be using the apparatus that day, switch of the heater control switch. Otherwise, leave it on for the next section.

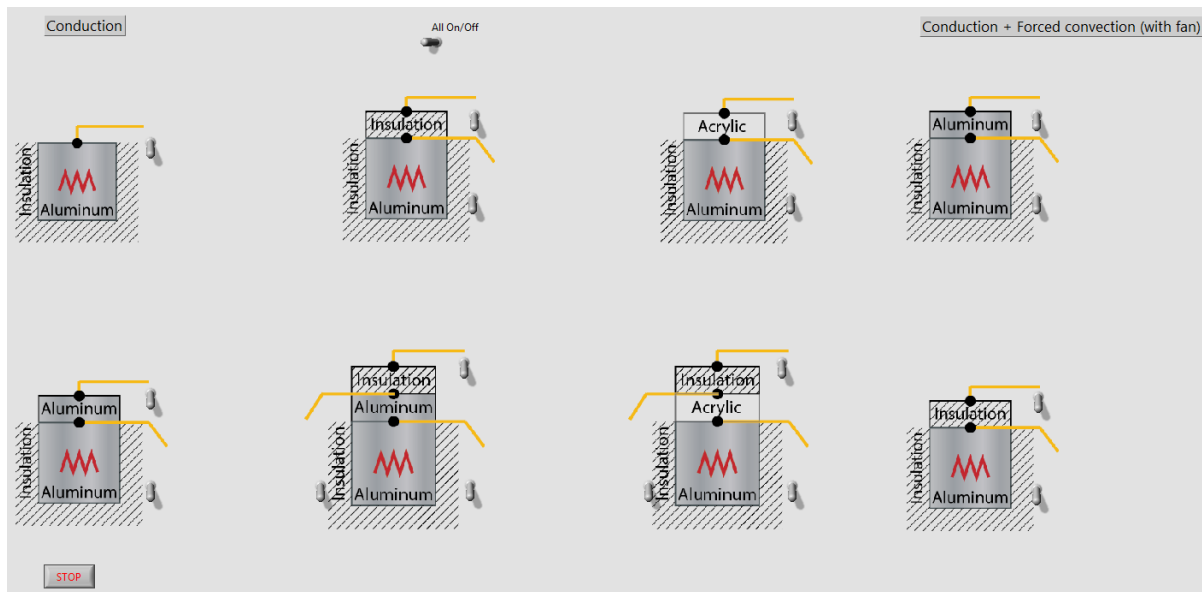


Figure 3 Computer interface to read temperatures from apparatus