1.3.4 Renewable Insulation

Design Portion

Your Name: Samiksha Emmaneni **Your Class: Medcalf, 2A**

MAKE YOUR OWN COPY of this document. When it is completed, download it as a PDF and submit it. Each group member shall submit their own work.

1) **Economics (15pts):** Calculate and Justify the Unit cost of your panel. You may enter a table, or include a VERY CLEAN and LEGIBLE photo of a table that you created in your Engineering Notebook. Remember that any scrap that wound up being discarded still counts toward the cost.

Items	**Bulk/Industrial Cost (converted to m^2)**	**Amount per Panel**	**Cost per Panel**	**Amount wasted**
Natural Cotton Batting 47” x 59” ⅛” thick	**$8.94 per m^2** $15.99 for 1.789 m^2 47in * 59in = 2773in^2 2773in^2 = 1.789m^2 $15.99/1.789$m^2$ = $8.94 per m^2	**256in^2 or 0.165191 m^2** 8in * 8in = 64in^2 64in^2 * 4 = 256in^2 (4 layers) 256in^2 = 0.165161m^2	**$1.48** $8.94/$m^2$ * 0.165191m^2 = $1.48	None
Packing Tape 2” x 110 yds 2 millimeters thick	**$4.89 per m^2** $25.00 for 5.1097$m^2$ 110yds = 3960in 2in * 3960in = 7920in^2 7920in^2 = 5.1097m^2 $25.00/5.1097$m^2$ = $4.89 per m^2	**64in^2 or 0.0412902m^2** 8in * 8in = 64in^2	**$0.20** $4.89/$m^2$ * 0.0412902m^2 = $0.20	None

Total cost of materials per m^2: **$13.83**
Total cost per Panel: **$1.68**

2) **DESCRIBE the way that your team set-up and conducted the test (10 pts).** Start this description off with what it was that you were trying to measure and therefore where you needed to place the probe or probes. What else did you need to find? In what time increments did you take time readings, and for how long?

My team and I had to create an insulative panel that could work effectively to minimize the heat loss in a box. The panel was 8 in x 8 in, with a thickness of ⅛ in. For this test, we had to measure the temperature outside and inside the box to see how effective our panel was. Using the recorded data, we were able to calculate the amount of heat loss. To measure the temperature, we used two temperature sensors. One sensor was placed inside the box on the panel to measure the temperature on the inside, and the other was on the outside to measure the temperature outside. We recorded the data that was reported to the device every minute, and we did this for 20 minutes. To record the data we created a chart with the time in minutes, and temperature in degrees Celcius.

3) **REFLECTION (10 pts).** Reflect on what you learned by completing this project. Include in your reflection what you wish you had done differently and what you need to work on to improve.

What I learned from this project was how to use thermodynamics to calculate the energy transfer in joules (J), occurring both inside and outside the box. I wish my group and I had added more materials to our panel as it could have been more effective in minimizing heat loss. We made a mistake by bringing in materials that were meant for insulation, which left us with only two items to work with. If we had done more research, we could have gathered more materials in time. I need to work on improving my focus when reading through project tasks and requirements. If I had focused more while reading through the document, I would not have missed that crucial information about the material.