

Renewable Energy

Lab 7 – Energy in Fuels – Fuel Burner

Fall 2010

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Introduction/Purpose:

In this exercise, we will learn how to measure the energy content in fuels. We will use a fuel burner to determine the energy content of various liquid fuels. This technique uses the temperature rise of a known amount of water when heated with burning fuel to determine the energy output.

Apparatus: Can, Fuel Burner, Thermometer, Various Fuels

Theory:

In this lab exercise, we will make use of ideas we learned in the energy conversion lab to explore the amount of energy in a specified amount of various fuels. We will use the burning fuels to heat a known amount of water and measure the temperature change of the water to determine (crudely) how much energy was released in the burning process. Obviously, we are assuming that all of the energy released is captured and used to change the temperature of the water. Is this a good assumption?

We learned previously that in order to raise the temperature of a material of mass m and specific heat c , ΔT degrees, $mc\Delta T$ energy (Q) must be added. So, if one knows the mass and specific heat of an object and measures a temperature difference, the energy that was added can be calculated.

Procedure:

Fuel Burner:

1. Determine the mass of the empty can. Add water and weigh again. Subtract to determine the mass of water.
2. Weigh the burner with fuel to determine the initial mass.
3. Light the burner and place under the can, monitoring the temperature of the water.
4. After the temperature has risen at least 10 degrees, record the temperature change and the final mass of the fuel burner.
5. Calculate the energy added to the water and divide by the mass of fuel burned.
6. Repeat for other fuels as time permits.