



Calculating Thermal Energy Loss Through Windows

QUESTION

How much heat is being lost in your home through the windows?

MATERIALS

- Tape Measure
- Calculator
- Internet

PROCEDURE

1. Use a tape measure to find the area, in square meters, of a window in your home.
2. Determine the U-factor of the window. If you do not know the U-factor use one of the standard ratings below:
 - a. Single pane window: 3.25
 - b. Dual-pane window: 2.84
 - c. Dual-pane, low-e window: 1.42
3. Calculate the average seasonal outside temperature for your location in degrees Celsius. Use data from the National Weather Service to find this information, www.nws.noaa.gov.
4. Record the inside temperature that your thermostat is set to in degrees Celsius. If you have a programmable thermostat and/or change temperatures throughout the day, calculate the average temperature.

DATA

Window Area: _____

U-factor: _____

Average seasonal outside temperature: _____

Average inside temperature: _____

CALCULATE

1. Use the following formula to calculate the heat loss occurring at the window each hour:

$$(\text{Inside Temperature} - \text{Outside Temperature}) \times \text{window area} \times \text{U-factor} = \text{Watts per hour}$$

$$\text{watts per hour} / 100 = \text{kW per hour}$$

2. Multiply the heat loss occurring at this window times the number of windows in your home. For more accurate results find the specific area for each window and re-calculate based on the different window dimensions.
3. The national average for electricity is \$0.12/kWh. If you heat your home with electric heat, how much is the heat loss costing your family each day? Each month?