

Joules Calorimeter

1010089

System Description

The Calorimeter is used for heating liquids (usually water) to determine the electrical equivalent of heat required to raise the temperature of a set weight of water a given number of degrees.

The unit consists of a calorimeter cup 100mm x 100mm (500ml max), Poly cup insert, insulated top plate fitted with 4mm terminals and suspended 2-3ohm heating coil and stirrer unit to ensure uniform mixing during heating.

Experiment

1. Place an exact weight of water into the aluminium cup and place the cup into the poly insulating jacket, then position the top plate and heating unit taking care to ensure the element is completely under the water and connect to a power supply but do not apply power at this stage.
2. Connect a voltmeter across the calorimeter terminals and an ammeter in series with one of the power leads so you can obtain a measurement of volts and amperes.
3. Fit a lab thermometer to the top plate through the bored stopper fitted but so it does not quite touch the bottom of the cup or the heating element.
4. Use the stirrer to ensure the water is thoroughly mixed before you start
5. now take an initial starting temperature reading
6. Using a stopwatch set at zero, simultaneously turn on the power and watch and whilst heating is proceeding take measurement of the volts and amps.
7. Stir the water often so mixing is complete and take readings of the temperature.
8. When the temperature reaches about 10 degrees centigrade warmer than the starting temperature stop the timer and turn off the power again simultaneously.... continue stirring and note the highest reading on the thermometer.

Information Derived

1. Weight of water
2. Initial temperature of water
3. Final temperature of water
4. Calculated temperature change
5. Elapsed time of heating
6. Watts of electrical power dissipated by the heater
7. Electrical energy passed into the water