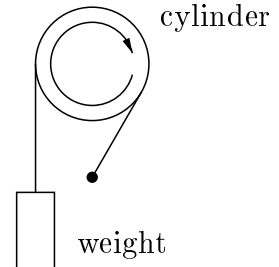


In this lab, you will measure the specific heat of aluminum. A strap is wound around an aluminum cylinder of mass m and radius r . One end of the strap is attached to a weight Mg , and the other end is secured to a fixed support. As you turn the cylinder, the weight is lifted up slightly. The strap slips around the cylinder, and the weight is lifted due to a frictional force Mg between the strap and cylinder. When you turn the cylinder one revolution, the work done by the friction is equal to $W = (Mg)(2\pi r)$. This work becomes heat which causes the temperature of the cylinder to rise.



The temperature of the cylinder is measured using a solid-state device called a thermistor which is embedded in the cylinder. The temperature is obtained by measuring the resistance of the thermistor. A chart at the lab will give you the relation between the resistance of the thermistor and its temperature.

In order to minimize the effect of the heat flow between the cylinder and the surrounding air, we first cool down the cylinder to a few degrees below room temperature. This is done by pressing the piece of cold aluminum supplied with the apparatus against the rotating cylinder until the resistance of the thermistor is about $4\text{ k}\Omega$. (Be patient; this may take a while.) If you go too far, you can warm up the cylinder by pressing your warm hands on it.

Record the initial resistance R_i below. Turn the crank on the cylinder. As you do so, you will observe the temperature of the cylinder rising. Count the number of revolutions of the crank. Note that every revolution of the crank produces 12 revolutions of the cylinder. Stop when the resistance of the thermistor is about $2.5\text{ k}\Omega$. This will require about 100 revolutions of the crank. Record the final resistance R_f . Also record the number N of revolutions of the *cylinder*. (Multiply the number of revolutions of the crank by 12.) Using the chart provided, find the initial temperature T_i and the final temperature T_f and calculate the change in temperature ΔT . The values of M , m , and r will be given to you in the lab. Record them below. Calculate the work W per revolution done. Calculate the total work W done. Calculate the specific heat c of the cylinder.

$R_i =$ _____ $T_i =$ _____

$R_f =$ _____ $T_f =$ _____

$\Delta T =$ _____ $N =$ _____

$M =$ _____ $m =$ _____ $r =$ _____

$W/\text{revolution} =$ _____ $\text{total } W =$ _____ $c =$ _____