Measuring Specific Heat Capacity (Aluminum)

Devices used:

Heat source, water, objects of different weights (Aluminum), and mask

Theory:

Define the **amount of heat** as the energy that if applied to a body, becomes hotter than it was or its state changes from some of its properties .As for **temperature**, it is at or a number indicating the body's resting place according to the trig of the min and the unit of measurement used for temperature in Celsius (the upper part is the unit of measurement of the amount of heat, a unit was previously used in the **Calorie** and is known as the amount of heat needed to raise the temperature of (1 gm) distilled water by one degree Celsius and since heat is a type of energy, it is measured in the same units of energy measurement, i.e. (1 C) is equivalent to (4.2 J) approximately.

If we add hot water to cold water, the temperature of the cold water rises, saying that it has gained an amount of heat, and the temperature of the hot water decreases, saying that it has lost an amount of heat. This can be likened to the transfer of liquids between two bodies of different capacities and shapes connected, so the liquid moves from the container in which it is at a higher level to the other container until the surface of the liquid is at a single horizontal level. The transfer of the liquid does not depend on its quantity in each of them .

If the two bodies come into contact and their temperatures are different, the thermal energy is transferred from the body with the higher temperature to the body with the lower temperature The transfer of heat between them stops when their temperatures become equal. The transfer of heat from one body to another by contact depends on the temperature of each of them and

does not depend on the amount of heat contained in each of them. When the transfer of heat between the bodies stops, the group or system is said to be in a state of thermal equilibrium. When the amount of heat lost by one of the bodies is equal to the amount of heat gained by the other body or bodies no Thermal energy leaks from and to the system) so the system must be placed in a thermally insulated container

That is:

the **amount of heat gained** = the **amount of heat lost**.

And then,

amount of heat = mass × specific heat capacity × change in temperature

Process Method

1. Place a quantity of water in the container on a heat source.
2. Place a body of insulated material and known mass inside the container immersed in water, so that it does not touch the bottom of the container and secure it with a holder.
3. Place a thermometer in the container so that it does not touch the bottom of the container.
4. We measure the temperature of the water until it reaches the boiling point.
5. We put water in another vessel at a temperature equal to three times the mass of the body.
6. When the water reaches the boiling point, we lift the body from the boiling water and put it in the vessel containing cold water.
7. We move the body inside the water and measure its temperature (the mixture) that has reached a state of equilibrium.
8. We apply the law of equilibrium or thermal equilibrium, which is:

The amount of heat gained = the amount of heat lost

and we find the specific heat capacity of each body and extract the error percentage

9. Calculation and results table:

Material Type	M_1 gm	M_2 gm	T_2 C°	T C°	C Cal/gm. C°
Aluminum	20	60			

$C_{Aluminum} = 0.22$ Cal/gm. C°

$$M^*C^*(t - t_2 = M^*C^*(t_2 - t)$$