$$A_{left\_right\_walls} := 2 \cdot (W_2 \cdot H_2)$$

$$A_{front\_rear\_walls} := 2 \cdot (L_2 \cdot H_2)$$

$$A_{top\_bottom\_walls} := 2 \cdot L_2 \cdot W_2$$

$$A_{total} := A_{left\_right\_walls} + A_{front\_rear\_walls} + A_{top\_bottom\_walls}$$

$$\Delta T := T_2 - T_1$$

$$Q_{convection} = h_{ABS\_PC} \cdot A_{total} \cdot \Delta T \text{ solve}, T_2 \rightarrow \frac{Q_{convection} + T_1 \cdot h_{ABS\_PC} \cdot (2 \cdot H_2 \cdot L_2 + 2 \cdot H_2 \cdot W_2 + 2 \cdot L_2 \cdot W_2)}{h_{ABS\_PC} \cdot (2 \cdot H_2 \cdot L_2 + 2 \cdot H_2 \cdot W_2 + 2 \cdot L_2 \cdot W_2)}$$

$$h_{ABS\_PC} := 2.5 \frac{W}{m^2 \cdot 1\,°C}$$

$$L_2 := 11.5in$$

$$W_2 := 5.5in$$

$$H_2 := 3in$$

$$A_{left\_right\_walls} := 2 \cdot (W_2 \cdot H_2) = 0.021\,m^2$$

$$A_{front\_rear\_walls} := 2 \cdot (L_2 \cdot H_2) = 0.045\,m^2$$

$$A_{top\_bottom\_walls} := 2 \cdot (L_2 \cdot W_2) = 0.082\,m^2$$

$$A_{total} := A_{left\_right\_walls} + A_{front\_rear\_walls} + A_{top\_bottom\_walls} = 0.147\,m^2$$

$$\Delta T := T_2 - T_1$$

$$T_1 := 10\,°C = 283.15\,K$$

$$Power_{normal\_operation} := 3watt$$

$$Q_{convection} := Power_{normal\_operation}$$

"There are numerous methods for calculating the heat transfer coefficient in different heat transfer modes, different fluids, flow regimes, and under different conditions. Often it can be estimated by dividing the thermal conductivity of the convection fluid by a length scale per http://en.wikipedia.org/wiki/Heat_transfer_coefficiet.

$$k_{ABS\_PC} := .2 \cdot \frac{watt}{m \cdot 1\,°C}$$

$$x_{wall\_thickness} := .1in = 2.54 \times 10^{-3}\,m$$

$$h_{ABS\_PC} := \frac{k_{ABS\_PC}}{x_{wall\_thickness}}$$

$$T_2 := \frac{Q_{convection} + T_1 \cdot h_{ABS\_PC} \cdot (2 \cdot H_2 \cdot L_2 + 2 \cdot H_2 \cdot W_2 + 2 \cdot L_2 \cdot W_2)}{h_{ABS\_PC} \cdot (2 \cdot H_2 \cdot L_2 + 2 \cdot H_2 \cdot W_2 + 2 \cdot L_2 \cdot W_2)}$$

$$T_2 = 80.853\,°C$$