

Equation of State for an Ideal Gas

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1. Results

Table 1 contains various quantities, both measured and given, that will be relevant to the analysis. They were collected in a table to assist with lookup.

T is the temperature of the room measured using a digital thermometer. The temperature was initially measured as 71 °F, then converted to kelvins as show in Equation 1.

$$T = \left(\frac{5}{9}(71 - 32) + 273.15 \right) \text{ K} = 294.82 \text{ K} \quad (1)$$

P_0 is the atmospheric pressure measured using a digital barometer. The pressure was initially measured as 28.93, then converted to pascals as shown in Equation 2.

$$P_0 = (28.93 \text{ in Hg}) \cdot \frac{25.4 \text{ mm Hg}}{1 \text{ in Hg}} \cdot \frac{101\,325 \text{ Pa}}{760 \text{ mm Hg}} = 97\,968 \text{ Pa} \quad (2)$$

m_p is the mass of the piston & platform, taken from the label on the gas law apparatus. D is the piston diameter, taken from the label on the gas law apparatus.

Table 1: Miscellaneous Quantities

Quantity	Value
T	294.82 K
P_0	97 968 Pa
m_p	35.0 g
D	32.5 mm

2. Analysis