

Study of Gas Laws

- **Gaseous state**
- - No fixed shape, volume, and boundary
 - Highly compressible
 - Gases exert pressure
 - High particle motion

Boyle's Law

- Relation between pressure (p) and volume (V)
- Statement – At constant temperature, the pressure of a fixed amount (number of moles, n) of a gas is inversely proportional to its volume.

Charles' Law

- Relation between temperature (T) and volume (V)
- Statement – At constant pressure, the volume of a fixed amount of a gas is directly proportional to its absolute temperature.

Standard Temperature and Pressure(STP)

The standard values are 0°C or 273K for temperature and 1 atm or 760 mm of Hg for pressure and are commonly known as **S.T.P.**

Mass:

S.I. Unit is kg.

Volume:

S.I. Unit is m^3 .

Density:

S.I. Unit is kg m^{-3} .

Temperature:

Three scales are

- °C (degree Celsius)
- °F (degree Fahrenheit)
- K (kelvin)

S.I. Unit is K

- Relation between °F and °C

$$^{\circ}\text{F} = \frac{9}{5}(^{\circ}\text{C}) + 32$$

- Relation between K and °C
 $\text{K} = ^{\circ}\text{C} + 273.15$

Ideal Gas

- The gas which strictly follows Boyle's law, Charles' law and Avogadro law

Ideal Gas Equation

- Equation obtained by the combination of Boyle's law, Charles' law and Avogadro law

$$\Rightarrow pV = nRT \dots\dots(i)$$

R = Proportionality constant, known as Universal Gas Constant

Equation (i) is called ideal gas equation.