

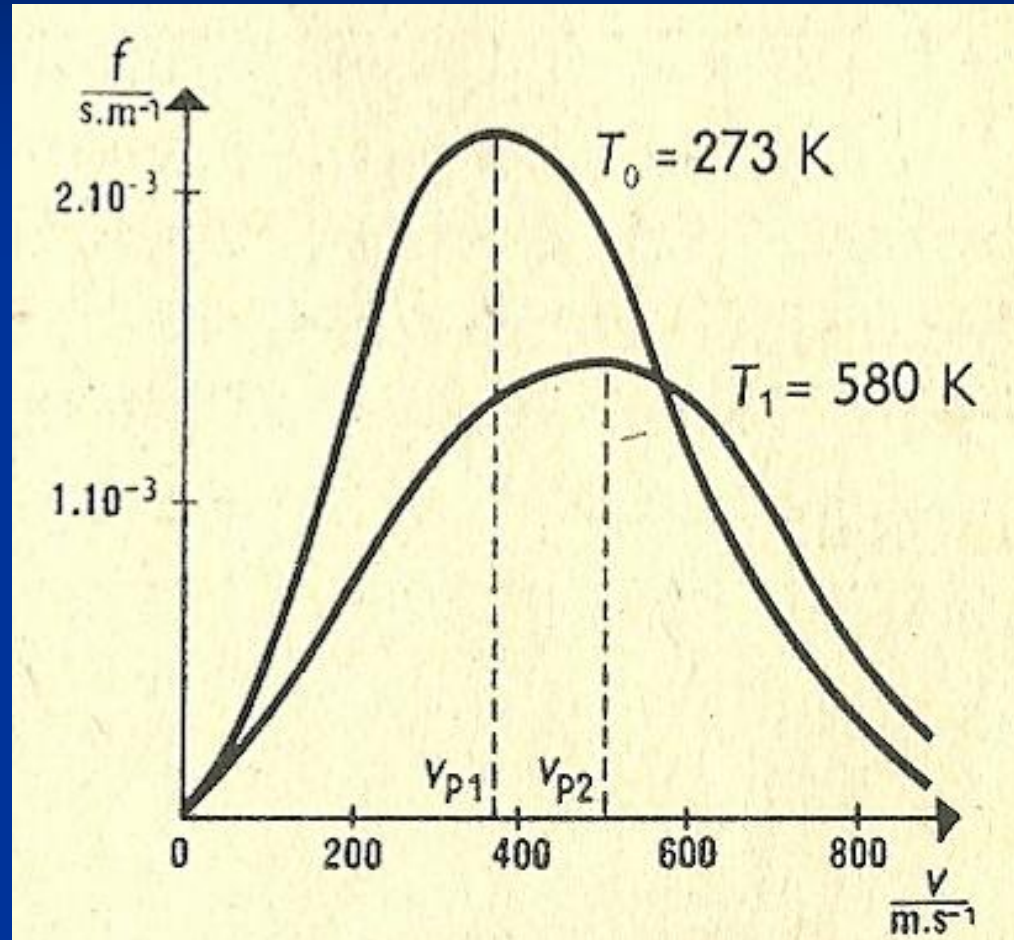
5. Ideal gas

Ideal gas

- Molecules of an ideal gas are neglectible small to the accordance to the distances between them.
- Molecules of an ideal gas don't act on each other by attractive forces.
- There are perfectly elastic collisions between molecules of an ideal gas.

(normal condition for gas means: temperature – 0°C, $p_n = 1.013\ 25 \times 10^5$ Pa)

The higher the temperature, the faster the molecules move.



Average mean square speed of molecules

$$KE = \frac{1}{2} m_0 (N_1 v_1^2 + \dots + N_i v_i^2) = KE = \frac{1}{2} N \cdot m_0 v_k^2, \quad \text{where}$$

m_0 – mass of one molecule (kg)

N_i – number of molecules moving at given speed (1)

v_i – speed of molecule (m.s⁻¹)

$$v_k^2 = (N_1 v_1^2 + \dots + N_i v_i^2) / N$$

$$v_k = \sqrt{(3kT / m_0)}$$

k – Boltzmann's constant = $1.38 \cdot 10^{-23}$ J.K⁻¹

$$p V = 2 / 3 KE$$

p – pressure (Pa)

V – volume (m^3)

KE – kinetic energy (J)