Collision Properties

(ii) Collision diameter :→ The minimum distance between the two center of the two molecule taking part in Just Collision is Calle d. The Collision diameter.

It is denoted as σ. larger The mean-free path smaller is The Collision. diameter.

(iii) Collision frequency :→ The number of molecules Collision occurs in one Second in one unit volume. is Called Collision frequency.

let a gas Contain N molecules per cc and and m is the number of molecules with which a single molecule will Collide Per Second.

It is given by the following relation

$$m = \sqrt{2} \, \pi \, \bar{v} \, \sigma^2 N.$$

where $\bar{v}$ = Avarage velocity
σ = Collision diameter.

if z is The total number of Collision taking Per Second Then $z = \sqrt{2} \pi \bar{v} \sigma^2 N \times N = \sqrt{2} \pi \bar{v} \sigma^2 N^2$

Since each Collision involves two molecule. The number of Collision Per Second per cc of the gas will be $z/2$ So, $z = \dfrac{\sqrt{2} \pi \bar{v} \sigma^2 N^2}{2}$

or $\boxed{z = \dfrac{\pi \bar{v} \sigma^2 N^2}{\sqrt{2}}}$.