Viscosity, a physical property, is a measure of how well adjacent molecules stick to one another. A solid can withstand a shearing force due to the strength of these sticky intermolecular forces. A fluid will continuously deform when subjected to a similar load. While a gas has a lower value of viscosity than a liquid, it is still an observable property. If gases had no viscosity, then they would not stick to the surface of a wing and form a boundary layer. A study of the delta wing in the Schlieren image reveals that the gas particles stick to one another.

The Chapman-Enskog equation may be used to estimate viscosity for a dilute gas. This equation is based on a semi-theoretical assumption by Chapman and Enskog. The equation requires three empirically determined parameters: the collision diameter (σ), the maximum energy of attraction divided by the Boltzmann constant (ϵ/κ) and the collision integral (ω(T*)) and all this three parameters are depends of number of particles:

$$\mu_0 \times 10^6 = 2.6693 \frac{(MT)^{1/2}}{\sigma^2 \omega(T^*)},$$

with

T* = κT/ε — reduced temperature (dimensionless),

μ0 = viscosity for dilute gas (μPa.s),

M = molecular mass (g/mol),

T = temperature (K),

σ = the collision diameter (Å),

ε / κ = the maximum energy of attraction divided by the Boltzmann constant (K),

ωμ = the collision integral.