Dynamic Viscosity

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The dynamic viscosity is a measure of the resistance of flow due to internal friction when one layer of fluid is caused to move in relationship to another consecutive layer (shear or absolute viscosity).

The SI unit of absolute viscosity is the Pascal second (Pa·s) or $kg \cdot m^{-1} \cdot s^{-1}$ or $N \cdot s \cdot m^{-2}$.

The common measurement unit is the milliPascal second (mPa·s), previously the poise (P).

Principal conversion factors are: 1 Pa·s = 10 P, and 1 cP = 1 mPa·s.

The Pascal second represents absolute viscosity, the tangential force (N) per unit area of either of two horizontal planes (m^2) at unit distance apart, the space between being filled with the fluid substance. A liquid with a dynamic viscosity of one Pascal second requires a force of one Newton to maintain a velocity differential of one meter per second over a surface one meter square.

A fluid is called a Newtonian fluid when the ratio of shearing stress to the rate of shear is constant at constant temperature and pressure, like: water alcohol, glycerol, and thin motor oils. For the non-Newtonian fluids, this ratio varies with the shearing stress, and then the viscosity of such fluids is called apparent viscosity, like: toothpaste, corn starch, paint, blood, and shampoo.