

A "Rosetta Stone" For Physical Units in the CGS System

Length

1 m = 100 cm = 1000 mm = 39.37 in = 3.28 ft

Volume

1 cm³ = 1 mL = 1 cc 1 L = 1000 ml = 1000 cm³
1 in³ = 16.39 cm³ = 16.39 cc

Mass

1 kg = 1000 g 1 slug = 14.528 kg

Weak Conversions (Due to use of mixed English force units): 1 lb = 454 g; 1 slug = 32 lb

Density of Common Liquids

Pure Water, 4 °C: $\rho = 1 \text{ g/mL} = 1 \text{ g/cm}^3$ (Specific Gravity = 1.0); @ 20 °C: $\rho = 0.998 \text{ g/mL}$

Human Blood, 37 °C: $1.056 \text{ g/cm}^3 \leq \rho \leq 1.066 \text{ g/cm}^3$ ($\bar{\rho} = 1.06 \text{ g/cm}^3$)

Mercury, 0 °C: $\rho = 13.63 \text{ g/mL}$; @ 20 °C: $\rho = 13.58 \text{ g/mL}$

Acceleration

1 G = 32.17 ft/s² = 980 cm/s² = 0.98 m/s²

Force

Newtons (N): 1 kg mass accelerated at 1 m/s² produces a reaction force of 1 N.

Dynes: 1 x 10⁵ Dynes = 1 N; 1 Dyne = 1 g-cm/s²

Pounds (lb): 1 lb = 4.448 N

Pressure

1 mm Hg = 13.6 mm H₂O = 1333.2 Dyne/cm² = 1 Torr (@ 20 °C)

1 mm Hg = 133.32 Pa = 0.00136 Atm = 0.536" H₂O = 1 Torr

1 Atm = 760 Torr = 760 mm Hg = 10336 mm H₂O

1 Pa = 10 Dyne/cm² = 0.0075 mm Hg

1 Dyne/cm² = 1 g/(cm-s²). (Dynes are the natural unit for force in the CGS system.)

Viscosity of Liquids

1 Poise = 1 g/(cm-s) = 0.1 Pa-s = 0.00075 mm Hg-s

Pure Water, 25 °C: 0.008904 Poise \approx 0.01 Poise (Viscosity falls with increasing temperature)

Human Blood, 37 °C: 0.04 Poise

Human Plasma, 37 °C: 0.015 Poise

Pus, 37 °C: Avg. 0.08 Poise

Corn Oil, 24 °C: 0.565 Poise

SAE-10W, 24 °C: Avg. 0.65 Poise

SAE-30W, 24 °C: Avg. 2.0 Poise

SAE-90W, 24 °C: Avg. 6.3 Poise

Glycerol: 14.92 Poise

Honey, 24 °C: Avg. 60 Poise

Fluid Resistance to Laminar (Parabolic) Flow

1 PRU (Peripheral Resistance Unit) = 1 mm Hg Δ / 1 mL/s = 1 mm Hg Δ / 1 cm³/s

1 Fluid-Ohm (f Ω) = 1 Dyne/cm² Δ / 1 cm³/s = 0.00075 PRU

Note 1: Δ Refers to pressure differential.

Note 2: Fluid-Ohms are convenience units. Not everyone uses the same definition.