Commonly used units in Fluid Mechanics - ©S.A. Kinnas, 2022

(to be continuously enhanced and improved!)

Remember also multiples of units: h(ecto)=100; k(ilo)=10^3; M(ega)=10^6; G(iga)=10^9; T(era)=10^{12}; Peta=10^{15}, and sub-multiples of units: c(enti)=10^{-2}; m(illi)=10^{-3}; μ (micro)=10^{-6}; n(ano)=10^{-9}; pico=10^{-12}

Quantity	**SI units**	**U.S. customary units**	**Definitions/equations**
L (Length)	m (=100 cm=1000 mm)	ft (=12 inches=0.3048 m)	
M (Mass)	kg	slug [=32.2 lbm(pound mass)=14.59 kg]	
T (time)	sec or s	sec or s	
v (velocity)	m/sec	ft/sec	Velocity=Distance/Time
a (acceleration)	m/sec^2	ft/sec^2	Acceleration=Velocity/Time
ω (angular velocity)	rad(ians)/sec or sec^{-1}	rad/sec or sec^{-1}	v(elocity)=ω*r(adius)
f (frequency)	cycles/sec = Hz (Hertz) = RPS (Revs Per Sec) [often RPM (Revs Per Min)]		$\omega=2\,\pi\,f=2\,\pi/T$
T (period)	sec	sec	T=1/f
F (Force)	N(ewton)=1kg*$1m/sec^2$	lbf (pound force)=1slug*$1ft/sec^2$	Force=Mass*Acceleration
W (Weight)	1kg (on earth) weighs: 1kg*$9.81\ m/sec^2$=9.81 N (=1 kp or kilopond)	1 slug (on earth) weighs: 1slug*$32.2\ ft/sec^2$=32.2 lbf	Weight=M*g(accel. of gravity)
g (accel. of gravity)	$g=9.81\ m/sec^2$	$g=32.2\ ft/sec^2$	
M(Moment) or Q(Torque)	N.m	lbf.ft	Moment=Force*Arm(distance)
W (Work)	J(oule)=N.m	lbf.ft	Work=Force*Distance
P (Power)	W(att)=J/sec	hp=550 lbf.ft/sec (1hp=0.746 kW)	Power=Work/Time
T (Temperature)	^oK(elvin)=273.15 + ^oC(elcius)	^oR(ankine)=459.67 + ^oF(ahrenheit)	$^oF=9/5*{}^oC+32$; $^oC=(^oF-32)*5/9$
p (pressure) p (standard atm pressure)	Pa(scal)=N/m^2; 1bar=10^5 Pa; 1mbar=100Pa=1hPa; 1 atm = 101.3 kPa; 1 Torr=1 mmHg p_{atm}=101.3 kPa=1,013 mbar=760mmHg	psi (lbf/in^2) or psf (lbf/ft^2) p_{atm}=14.696 psi =29.92 inHg	pressure=Normal Force/Area
τ (shear stress)	Pa(scal)=N/m^2	psi (lbf/in^2) or psf (lbf/ft^2)	shear stress=Shear Force/Area
ρ (density)	kg/m^3	$slugs/ft^3$	ρ=Mass/Volume
γ (specific weight)	N/m^3	lbf/ft^3	γ=Weight/Volume=ρ g
S.G. (specific gravity)	unitless!	unitless!	S.G.=$\gamma/\gamma_{water.}=\rho/\rho_{water}$
μ (dynamic viscosity)	Pa.sec = $N.sec/m^2$ (1 poise= 10^{-1} Pa.sec)	$lbf.sec/ft^2$	$\tau=\mu\ dv/dy$
ν (kinematic viscosity)	m^2/sec (1 stokes=10^{-4} m^2/sec)	ft^2/sec	$\nu=\mu/\rho$
σ (surface tension)	N/m	lbf/ft	Force=σ * Length