

()

Temp. °C	Specific weight (γ) N/m ³	Density (ρ) kg/m ³	Dynamic viscosity (μ) Pa.s 10 ³ μ =	Kinematic viscosity (ν) m ² /sec 10 ⁶ ν =	Surface tension (σ) N/m 100 σ =	Vapor. Pressure (h_v) = P/ γ m	Elasticity (E) N/m ² 10 ⁻⁷ E =
0	9805	999.0	1.792	1.792	7.62	0.06	204
5	9806	1000.0	1.519	1.519	7.54	0.09	206
10	9803	999.7	1.308	1.308	7.48	0.12	211
15	9798	999.1	1.140	1.141	7.41	0.17	214
20	9789	998.2	1.005	1.007	7.36	0.25	220
25	9779	997.1	0.894	0.897	7.26	0.33	222
30	9767	995.7	0.801	0.804	7.18	0.44	223
35	9752	994.1	0.723	0.727	7.10	0.58	221
40	9737	992.2	0.656	0.661	7.01	0.76	227
45	9720	990.2	0.599	0.605	6.92	0.98	229
50	9697	988.1	0.549	0.556	6.82	1.26	230
55	9679	985.7	0.506	0.513	6.74	1.61	231
60	9658	983.2	0.469	0.477	6.68	2.03	228
65	9635	980.6	0.436	0.444	6.58	2.56	226
70	9600	977.8	0.406	0.415	6.50	3.20	225
75	9589	974.9	0.380	0.390	6.40	3.96	223
80	9557	961.8	0.357	0.367	6.30	4.86	221
85	9529	968.6	0.336	0.347	6.20	5.93	217
90	9499	965.3	0.317	0.328	6.12	7.18	216
95	9469	961.9	0.299	0.311	6.02	8.62	211
100	9438	958.4	0.284	0.296	5.94	10.33	207

()

$\rho = 1000 \text{ kg/m}^3$	$\rho = 1 \text{ gm/cm}^3$	$\rho = 1.94 \text{ slug/ft}^3$	(ρ)
$\gamma = 9810 \text{ N/m}^3$	$\gamma = 981 \text{ dyne/cm}^3$	$\gamma = 62.6 \text{ lb}_w/\text{ft}^3$) γ (
$\mu = 0.001 \text{ Pa}\cdot\text{sec}$	$\mu = 0.01 \text{ poise}$	$\mu = 2.05 \times 10^{-3} \text{ lb}_w\cdot\text{sec/ft}^2$	(μ)
$\nu = 1 \times 10^{-6} \text{ m}^2/\text{sec}$	$\nu = 0.01 \text{ stoke}$	$\nu = 1 \times 10^{-5} \text{ ft}^2/\text{sec}$	(ν)
$E = 206 \times 10^7 \text{ Pa}$	$E = 206 \times 10^5 \text{ dyne/m}^2$	$E = 298 \times 10^3 \text{ psi}$	(E)

()

		F, L, T	M, L, T		
ft	m	L	L	l	Length
ft ²	m ²	L ²	L ²	A	Area
ft ³	m ³	L ³	L ³	V	Volume
ft ⁴	m ⁴	L ⁴	L ⁴	I	Moment of inertia
sec	sec	T	T	T	Time
rad/sec	rad/sec	T ⁻¹	T ⁻¹	ω	Angular velocity
sec ⁻¹	sec ⁻¹	T ⁻¹	T ⁻¹	N	Rotation speed
ft/sec	m/sec	LT ⁻¹	LT ⁻¹	v	Velocity
ft/sec ²	m/sec ²	LT ⁻²	LT ⁻²	a, g	Acceleration
ft ³ /sec	m ³ /sec	L ³ T ⁻¹	L ³ T ⁻¹	Q	Discharge
ft ² /sec	m ² /sec	L ² T ⁻¹	L ² T ⁻¹	ν	Kinematic viscosity
slug	kg	FT ² L ⁻¹	M	M	Mass
lb	N	F	MLT ⁻²	F	Force
lb	N	F	MLT ⁻²	W	Weight
lb/ft ²	Pa	FL ⁻²	ML ⁻¹ T ⁻²	P	Pressure
lb/ft ³	N/m ³	FL ⁻³	ML ⁻² T ⁻²	γ	Specific weight
slug/ft ³	kg/m ³	FT ² L ⁻⁴	ML ⁻³	ρ	Density
lb.sec/ft ²	Pa.sec	FTL ⁻²	ML ⁻¹ T ⁻¹	μ	Viscosity
lb/ft ²	Pa	FL ⁻²	ML ⁻¹ T ⁻²	E	Elasticity
lb/ft	N/m	FL ⁻¹	MT ⁻²	σ	Surface tension
lb/ft ²	Pa	FL ⁻²	ML ⁻¹ T ⁻²	τ	Shear stress
lb.ft	N.m	F.L	ML ² T ⁻²	T	Torque
lb.ft	N.m	F.L	ML ² T ⁻²	E	Energy
lb.ft	N.m	F.L	ML ² T ⁻²	W	Work
lb.ft/sec	watt	FLT ⁻¹	ML ² T ⁻³	P	Power

$$F = M \cdot a$$

$$lb_w = slug \cdot ft/sec^2$$

$$dyne = gm \cdot cm/sec^2$$

$$N = kg \cdot m/sec^2$$

()

	SI			
in = 2.54 cm m = 3.28 ft mi = 1.609 km	km , m	cm = 10 mm m = 100 cm km = 1000 m	ft = 12 in yd = 3 ft mi = 5280 ft	
acre = 4047 m ² m ² = 10.76 ft ² mi ² = 640 acre mi ² = 2.59 km ²	ka , km ² , m ²	mm ² , cm ² , m ² , km ² fed. = 4200 m ² don. = 1000 m ² ha = 10000 m ²	in ² , ft ² , mi ² , yd ² acre = 43571 ft ²	
Gal = 3.785 Lit m ³ = 35.31 ft ³	m ³ , Lit	mm ³ , cm ³ , m ³ m ³ = 1000 Lit Lit = 1000 cm ³	in ³ , ft ³ , yd ³ ft ³ = 7.48 Gal	
kg = 2.204 lb lb = 453.6 gm	kg , gm	kg = 1000 gm ton = 1000 kg	slug = 32.2 lb ton = 2240 lb	
lb = 4.448 N	N	N = 10 ⁵ dyne kg _w = 9.81 N	lb	
bar = 100 kPa psi = 6900 Pa kg/cm ² = 14.2 psi	Pa = N/m ² kPa = 1000 Pa MPa = 10 ⁶ Pa	atm = 1.033 kg/cm ² bar = 1.02 kg/cm ² atm = 0.101 MPa	atm = 14.7 psi atm = 29.92 in Hg atm = 33.88 ft H ₂ O	
J = 0.737 lb.ft J = 9.48×10 ⁻⁴ Btu	J = N.m J = 0.239 cal	dyne.cm	lb.ft	
watt = 0.737 lb.ft/sec HP = 550 lb.ft/sec kw = 1.341 HP	watt = N.m/sec watt = J/sec kw = 1000 watt	dyne.cm/sec	lb.ft/sec	
Pa.sec = 0.021 lb.s/ft ²	N.sec/m ² = Pa.s Pa.sec = 10 poise	dyne.sec/cm ² = poise	lb.sec/ft ²	
ft ² /s = 929 stok	m ² /s = 10 ⁴ stok	cm ² /s = stok	ft ² /s	

()

(e)		()
0.9 - 9.0	1.83	Riveted steel
0.3 - 3.0	1.20	Concrete
0.18 - 0.90	0.61	Wood Stave
0.14 - 0.71	0.25	Cast iron
0.071 - 0.240	0.15	Galvanized iron
0.071 - 0.180	0.12	Asphalted cast iron
0.03 - 0.09	0.061	Commercial steel or Wrought iron
0.0015	0.0015	Drawn tubing
0.0015	0.0015	Brass
0.10 - 0.20	0.15	Aluminium