Emerson & Cuming
a National Starch & Chemical Company

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Technical Data Sheet
Technical Tip

Conversions

Introduction
Anyone working with polymers knows that no two documents use the same units of measure to describe the same property. While there are many conversions, we have selected those that we find most useful and commonplace.

Length

1 mil = 0.001 in = 0.025 mm = 25.4 microns
1 in = 2.54 cm = 25.4 mm = 25,400 microns
1 ft = 30.48 cm = 0.3048 m
1 micron = 0.001 mm = 0.0394 mils
1 mm = 0.039 in = 39 mils
1 cm = 0.3937 in = 394 mils = 10 mm
1 meter =1.0936 yd = 3.281 ft = 39.37 in

Area

1 in^2 = 6.5 cm^2
1 cm^2 = 0.16 in^2
1 ft^2 = 0.09 m^2
1 m^2 = 10.76ft^2 = 1.20 yd^2
1 yd^2 = 0.84 m^2

Weight

1 oz = 28349.52 mg = 28.35 g
1 mg = 0.000035274 oz
1 g = 0.0352740 oz = 0.0022046 lb
1 lb = 453.59 g = 0.4536 kg
1 kg = 2.2046 lb

Density

lbs/gal = kg/liter X 8.34 = g/cm^3 X 8.34
kg/liter = g/cm^3 = g/ml = lb/gal X 0.12

Viscosity

1 P = 0.1 $N.s/m^2$ = 0.1 Pa.s = 100 cP
1 P = 0.0020886 lb-force-s/ft^2 = 0.06721 lb/ft-s
1 Pa.s = 1 $N.s/m^2$ = 1000 cP = 10 P

Pressure

1 atm = 29.92 in Hg = 76 cm Hg = 33.96 ft of H_2O
1 atm = 1.0332 kg/cm^2 = 101.32 kPa = 14.69 psi
1 Pa = 0.0001450 psi
1 kPa = 0.1450 psi

Temperature

°F = (1.8 X °C) + 32
°C = 0.556 (°F - 32) = °K - 273
°K = °C + 273

Conductivity - Electrical

Volume resistivity = Ω.cm
Surface resistivity = Ω / square / mil
Ω.cm = Ω / square / mil X 0.0025
Ω / square / mil = Ω.cm X 397.3

Conductivity - Thermal

See Technical Tip "Using Thermally Conductive Materials".

Key

in = inch	mm = millimeter	mg = milligram	Pa = Pascal
ft = foot	m = meter	ml = milliliter	kPa = kilo Pascal
yd = yard	cm = centimeter	s = second	Mpa = Mega Pascal
lb = pound	kg = kilogram	atm = atmosphere	pli = pounds per linear inch
oz = ounce	g = gram	P = Poise	Ω = Ohm
Hg = Mercury	N = Newton	cP = centipoise	psi = pounds per square inch

Prefixes

centi = 10^{-2} milli = 10^{-3} micro = 10^{-6} kilo = 10^{3} mega = 10^{6}

Volumetric Conversion Chart

Multiply volume in units of left hand column by factor to obtain volume in units of top row

	cm^3 or ml	liter	m^3	in^3	ft^3	oz	pint US	quart US	gallon US	gallon Imp
cm^3 or ml	1	0.001	0.000001	0.061	0.0004	0.03378	0.0021	0.0011	0.0002642	0.00022
liter	1000	1	0.001	61.02	0.0353	33.78	2.1	1.06	0.2642	0.2192
m^3	1000000	1000	1	61024	35315	33780	2113	1057	264.17	219.26
in^3	16.4	0.0164	0.0000164	1	0.00058	0.00003	0.0005	0.0001	0.00433	0.0036
ft^3	28300	28.3	0.0283	1728	1	0.058	0.94	1.87	7.48	6.21
oz	29.57	0.0296	0.00003	1.8	0.001	1	0.0625	0.031	128	106.59
pint US	473.2	0.47	0.00048	28.8	0.0167	16	1	2.5	0.125	0.010
quart US	946.2	0.95	0.00095	57.6	0.0334	32	2	1	0.25	0.208
gallon US	3785	3.785	0.0038	231	0.1337	128	8	4	1	0.8327
gallon Imp	4546	4.546	0.0045	277	0.1606	153.7	9.6	4.8	1.2	1

Strength

Lap Shear

kg/cm^2 = (psi) X 0.0702 = (Pa) X 0.00001
Pa = (psi) X 6864.76 = (kg/cm^2) X 97836
MPa = (psi) X 0.0069 = (Pa) / 1000000
psi = (kg/cm^2) X 14.245 = (Pa) X 0.000146

Peel Strength

N/m = (pli) X 175.1
kg/cm = (pli) X 0.178
pli = (N/m) X 0.0057 = (kg/cm) X 5.62

Cost Conversions

$/liter = ($/kg) X (g/cm^3)
$/gal = ($/lb) X (g/cm^3) X 8.34
$/lb = ($/kg) / 2.2
$/kg = ($/lb) X 2.2
$/$cm^3$ = ($/liter) / 1000 = ($/in^3) X 0.061
$/$in^3$ = ($/gal) / 231 = ($/cm^3) X 16.4
$/$ft^2$/mil = ($/gal) (gm/cm^3) X 0.0052
$/$m^2$/mm = ($/kg)(g/cm^3) X 0.026

Dielectric Strength

V= Volts kV = kilovolts
V/mil = (V/mm) X 0.025
V/mm = (V/mil) X 39.37 = (kV/mm) X 1000
kV/mm = (V/mil) X 0.03937 = (V/mm) X 0.001

Coverage

1,604 ft^2/gal at 1 mil thickness (or 38 m^2/liter at 25 micron thickness). As the coating thickness increases, the coverage is reduced proportionately. If the coating contains volatile materials, multiply the coverage by the percent solids by volume to obtain the dried coverage.

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