AIR LIQUIDE
SPECIALTY GASES

Conversion Factors

Multiply	By	To Obtain
Temperature		
°Fahrenheit (F) + 459.72	1	°F Absolute, or Rankine
°Fahrenheit (F) - 32	0.555	°Celsius (C)
°Celsius (C) + 273.16	1	°C Absolute, or Kelvin (K)
°Celsius (C) + 17.78	1.8	°Fahrenheit (F)
°Rankine (R) - 459.72	1	°Fahrenheit (F)
°Kelvin (K) - 273.16	1	°Celsius (C)
Density		
Grams per cubic centimeter	62.428	Pounds per cubic feet
	0.03613	Pounds per cubic inch
	8.345	Pounds per U.S. gallon
Gram moles of Ideal Gas		
@ 0°C and 760 mm Hg	22.4140	Liters
Pounds per cubic inch	1728	Pounds per cubic foot
	27.68	Grams per cubic centimeter
Pound moles of Ideal Gas		
@ 0°C and 760 mm Hg	359.05	Cubic feet
Volume		
Barrels	42	Gallons (Oil)
	31.5	Gallons
Cubic centimeters	10^{-3}	Liters
	0.0610	Cubic inches
Cubic feet	28317	Cubic centimeters
	1728	Cubic inches
	0.02832	Cubic meters
	0.03704	Cubic yards
	7.481	Gallons
	28.32	Liters
Cubic inches	16.387	Cubic centimeters
	0.01639	Liters
	4.329×10^{-3}	Gallons
	0.01732	Quarts (liquid)
Gallons, Imperial	277.4	Cubic inches
	1.201	U.S. gallons
	4.546	Liters
Gallons, U.S. (liquid)	231	Cubic inches
	0.1337	Cubic feet
	3.785	Liters
	0.8327	Imperial gallons
	128	Fluid ounces
Ounces (fluid)	29.57	Cubic centimeters
	1.805	Cubic inches
Liters	0.2642	Gallons
	0.0353	Cubic feet
	1.0567	Quarts
	61.025	Cubic inches
Quarts, U.S. (liquid)	0.0334	Cubic feet
	57.749	Cubic inches
	0.9463	Liters

Multiply	By	To Obtain
Weight		
Milligrams	2.2046×10^{-6}	Pounds (avoirdupois)
	3.5274×10^{-5}	Ounces (avoirdupois)
	0.01543	Grains
	1×10^{-6}	Kilograms
Micrograms	1×10^{-6}	Grams
Grams	0.00220	Pounds (avoirdupois)
	0.03527	Ounces (avoirdupois)
	15.432	Grains
	1×10^{6}	Micrograms
Kilograms	0.00110	Tons (short)
	2.2046	Pounds (avoirdupois)
	35.274	Ounces (avoirdupois)
	1.5432×10^{4}	Grains
Grains	1.4286×10^{-4}	Pounds (avoirdupois)
	0.00229	Ounces (avoirdupois)
	0.06480	Grams
	64.799	Milligrams
Ounces (avoirdupois)	3.1250×10^{-5}	Tons (short)
	0.06250	Pounds (avoirdupois)
	437.50	Grains
	28.350	Grams
Pounds (avoirdupois)	5×10^{-4}	Tons (short)
	16	Ounces (avoirdupois)
	7000	Grains
	0.45359	Kilograms
	453.59	Grams
Tons (short, U.S.)	2000	Pounds (avoirdupois)
	3.200×10^{4}	Ounces (avoirdupois)
	907.19	Kilograms
Tons (long)	2240	Pounds (avoirdupois)
	1016	Kilograms
Tons (metric)	1000	Kilograms
	2205	Pounds (avoirdupois)
	1.102	Tons (short)
Viscosity (Absolute)		
Poise	1	gm./cm. sec.
	1	dyne sec./$cm.^2$
	100	Centipoise
Centipoise	0.000672	lb./ft. sec.
	0.0000209	lb. sec./$ft.^2$
	2.42	lb./ft. hr.
Viscosity (Kinematic)		
Stoke	1	$cm.^2$/sec.
	0.155	$in.^2$/sec.
	0.001076	$ft.^2$/sec.

AIR LIQUIDE
SPECIALTY GASES

Conversion Factors continued

Multiply	By	To Obtain	Multiply	By	To Obtain
Velocity			**Length**		
Feet per minute	0.01136	Miles per hour	Angstrom units	1×10^{-10}	Meters
	0.01829	Kilometers per hour		3.9370×10^{-9}	Inches
	0.5080	Centimeters per second		1×10^{-4}	Microns
	0.01667	Feet per second		1×10^{-8}	Centimeters
Feet per second	0.6818	Miles per hour		0.1	Millimicrons
	1.097	Kilometers per hour	Millimicrons	1×10^{-9}	Meters
	30.48	Centimeters per second		1×10^{-7}	Centimeters
	0.3048	Meters per second		10	Angstrom units
	0.5921	Knots	Microns (um)	3.9370×10^{-5}	Inches
Knots	1	Nautical miles per hour		1×10^{-6}	Meters
	1.6889	Feet per second		1×10^{-4}	Centimeters
	1.1515	Miles per hour		1×10^{4}	Angstrom units
	1.8532	Kilometers per hour	Millimeters	0.03937	Inches (US)
	0.5148	Meters per second		1000	Microns
Meters per second	3.281	Feet per second	Centimeters	0.39370	Inches (US)
	2.237	Miles per hour		1×10^{4}	Microns (um)
	3.600	Kilometers per hour		1×10^{7}	Millimicrons
Miles per hour	1.467	Feet per second		1×10^{8}	Angstrom units
	0.4470	Meters per second	Meters	6.2137×10^{-4}	Miles (statute)
	1.609	Kilometers per hour		1.0936	Yards (US)
	0.8684	Knots		39.370	Inches (US)
				1×10^{9}	Millimicrons
Area			Kilometers	0.53961	Miles (nautical)
Square millimeters	0.00155	Square inches		0.62137	Miles (statute)
	1×10^{-6}	Square meters		1093.6	Yards
	0.01	Square centimeters		2280.8	Feet
	1.2732	Circular millimeters	Inches (US)	0.02778	Yards
Square centimeters	1.1960×10^{-4}	Square yards		2.5400	Centimeters
	0.00108	Square feet		2.5400×10^{8}	Angstrom units
	0.15500	Square inches	Feet (US)	0.30480	Meters
	1×10^{-4}	Square meters		30.480	Centimeters
	100	Square millimeters	Yards (US)	5.6818×10^{-4}	Miles
Square kilometers	0.38610	Square miles (US)		0.91440	Meters
	1.1960×10^{6}	Square yards		91.440	Centimeters
	1.0764×10^{7}	Square feet	Miles (nautical)	1.1516	Statute miles
	1×10^{6}	Square meters		2026.8	Yards
	247.10	Acres (US)		1.8533	Kilometers
Square inches (US)	0.00694	Square feet	Miles (US statute)	320	Rods
	0.00077	Square yards		0.86836	Nautical miles
	6.4516×10^{-4}	Square meters		1.6094	Kilometers
	6.4516	Square centimeters		1609.4	Meters
Square feet (US)	3.5870×10^{-8}	Square miles			
	0.11111	Square yards	**Thermal Conductivity**		
	144	Square inches	BTU/(hr.)(ft.^{2})		
	0.09290	Square meters	(°F/ft.)	0.00413	cal/sec. (cm.^{2}(°C/cm.))
	929.03	Square centimeters		12	BTU/(hr.)(ft.^{2})(°F/in.)
	2.2957×10^{-5}	Acres		0.0173	Watts/(cm.2)(°C/cm.)
Square miles	640	Acres			
	3.0967×10^{6}	Square yards			
	2.7878×10^{7}	Square feet			
	2.5900	Square kilometers			
	2.5900×10^{8}	Square meters			

Conversion Factors continued

Multiply	By	To Obtain	Multiply	By	To Obtain
Pressure			**Flow**		
Atmospheres	760	Millimeters of Mercury	Barrels per hour	0.0936	Cubic feet per minute
	29.921	Inches of Mercury		5.615	Cubic feet per hour
	33.93	Feet of Water		0.700	Gallons (US) per minute
	10332	kg./m.^{2}		42.00	Gallons (US) per hour
	14.696	lbs./sq. in. (psi)		2.650	Liters per minute
	2216.2	lbs./sq. ft.		158.984	Liters per hour
	1.0133	Bars	Cubic Centimeters		
	1.0332	kg./cm.^{2}	per second	0.001	Liters per second
Centimeters of Mercury	5.3524	Inches of Water		0.060	Liters per minute
	0.4460	Feet of Water		0.00212	Cubic feet per minute
	0.1934	lbs./sq. in. (psi)	Cubic Feet per minute	471.70	Cubic centimeters/second
	27.854	lbs./sq. ft.		1.699	Cubic meters per hour
	135.95	kg./m.^{2}		0.000472	Cubic meters per second
Feet of Water	0.02947	Atmospheres		0.12468	Gallons (US) per sec.
	0.4335	lbs./sq. in. (psi)		0.4719	Liters per second
	62.378	lbs./sq. ft.		28.316	Liters per minute
Inches of Mercury	0.03342	Atmospheres	Liters per minute	2.119	Cubic feet per hour
	13.60	Inches of Water		0.0600	Cubic meters per hour
	1.133	Feet of Water		0.2642	Gallons (US) per minute
	0.4912	lbs./sq. in. (psi)	Cubic meters per hour	0.5886	Cubic feet per minute
	70.727	lbs./sq. ft.		16.666	Liters per minute
	345.32	kg./m.^{2}		4.404	Gallons (US) per minute
Inches of Water	0.03609	lbs./sq. in. (psi)	Gallons (US) per minute	1.4286	Barrels per hour
	5.1981	lbs./sq. ft.		0.0631	Liters per second
	25.38	kg./m.^{2}		0.2271	Cubic meters per hour
Kilograms per square				0.1337	Cubic feet per minute
centimeter (kg./cm.^{2})	0.9678	Atmospheres			
	14.22	lbs./sq. in. (psi)			
Kilograms per square					
meter (kg./m.^{2})	0.00142	lbs./sq. in. (psi)			
	0.20482	lbs./sq. ft.			
	0.00328	Feet of Water			
	0.1	gm./cm.^{2}			
	9.80665	Pascals			
Kilopascals	0.00987	Atmospheres			
	0.29613	Inches of Mercury (60°F)			
	0.33456	Feet of Water (39.2°F)			
	101.97162	kg./m.^{2}			
	0.14504	lbs./sq. in. (psi)			
	20.88543	lbs./sq. ft.			
	0.01000	Bars			
	0.01020	kg./cm.^{2}			
Pounds per					
square inch (psi)	70.31	gm./cm.^{2}			
	2.036	Inches of Mercy			
	2.311	Feet of Water			
	6.8948	Kilopascals			
Torr	0.001316	Atmospheres			
	0.001333	Bar			
	1000	Millitorr			
	1.333	Millibar			
	1000	Micron (Hg)			

Conversion Factors continued

Concentration

1,000,000 ppm	100%
100,000 ppm	10%
10,000 ppm	1%
1000 ppm	0.1%
100 ppm	0.01%
10 ppm	0.001%
1 ppm	0.0001%
1000 ppb	1 ppm
100 ppb	0.1 ppm
10 ppb	0.01 ppm
1 ppb	0.001 ppm
1000 ppt	0.001 ppm
100 ppt	0.0001 ppm
10 ppt	0.00001 ppm
1 ppt	0.000001 ppm
1000 ppt	1 ppb
100 ppt	0.1 ppb
10 ppt	0.01 ppb
1 ppt	0.001 ppb

The Industrial and Specialty Gas DATA BOOK from Air Liquide

Our compact data book contains detailed conversion factors based on standard industry references.

Contact your Air Liquide representative to obtain your copy.

Dew Point – Moisture

Dew Point °F	Moisture ppm (vol/vol)
-130	0.1
-120	0.25
-110	0.63
-105	1.00
-104	1.08
-103	1.18
-102	1.29
-101	1.40
-100	1.53
-99	1.66
-98	1.81
-97	1.96
-96	2.15
-95	2.35
-94	2.54
-93	2.76
-92	3.00
-91	3.28
-90	3.53
-89	3.84
-88	4.15
-87	4.50
-86	4.78
-85	5.3
-84	5.7
-83	6.2
-82	6.6
-81	7.2
-80	7.8
-79	8.4
-78	9.1
-77	9.8
-76	10.5
-75	11.4
-74	12.3
-73	13.3
-72	14.3
-71	15.4
-70	16.6
-69	17.9
-68	19.2
-67	20.6
-66	22.1
-65	23.6
-64	25.6
-63	27.5
-62	29.4
-61	31.7
-60	34.0

SI Terms

10^9	Giga
10^6	Mega
10^3	Kilo
10^2	Hecta
10^1	Deka
10^{-1}	Deci
10^{-2}	Centi
10^{-3}	Milli
10^{-6}	Micro
10^{-9}	Nano
10^{-12}	Pico
10^{-15}	Femto

International Units

Kilogram, Force	9.8066 Newtons
Pascal	1 Newton/m^2
Poundal	0.13825 Newton
Pound, Force	4.448 Newton
Dyne	1.00 x 10^{-5}

Physical Constants

Avogadro Constant (Na)
6.02252 x 10^{23} molecules/mole

Normal Volume of Ideal Gas at 0°C
1 atm. (Vol)
22.4140 liters/g-mole

Gas Constant (R)
0.08205 liter atm./g-mole °K
8.314 x 10^{-7} ergs/g-mole °K
8.314 joules/g-mole °K
1.987 cal/g-mole °K
10.73 psia cu. ft./lb.-mole °R