Thermal Conductivity

METALS		(Watts cm °C)
Silver	(Ag)	4.08
Copper	(Cu)	3.94
Gold	(Au)	2.96
Aluminum	(Al)	2.18
Beryllium	(Be)	2.00
Tungsten	(W)	1.74
Rhodium	(Rh)	1.50
Molybdenum	(Mo)	1.46
Brass	(66%Cu, 34% Zn)	1.110
Chromium	(Cr)	0.937
Nickel	(Ni)	0.920
Platinum	(Pt)	0.716
Tin	(Sn)	0.666
Tantalum	(Ta)	0.575
Lead	(Pb)	0.353
Titanium	(Ti)	0.219
Manganese	(Mn)	0.078

INSULATORS		(Watts cm °C)
Diamond	(CVD)	10.0–16.0
Beryllium Oxide 99.5%	(BeO)	2.61
Aluminum Nitride	(AlN)	1.70
Boron Nitride	(HBN 500°)	0.59
Sapphire		0.46
Alumina Oxide 99.6%	(Al_2O_3)	0.36
Alumina Oxide 96%	(Al_2O_3)	0.26
Alumina Oxide 91%	(Al_2O_3)	0.13
Glass		0.015
Mica		0.0043–0.0062
Air		0.00026

BONDING	(Watts cm °C)
Gold Germanium 88/12	0.8834
Gold Tin 80/20	0.6824
Tin Lead Solder (Sn62)	0.4921
Indium 100%	0.2386
Silver Filled Epoxy	0.0156
Epoxy	0.0099

Temperature Conversion

Degrees F	=	9/5 (Degrees C) + 32
Degrees C	=	5/9 (Degrees F) – 32

Gold Conversion

EQUIVALENTS

1 Kilogram	=	32.15 Troy Ounces
1 Troy Ounce	=	31.103 Grams
1 Pound	=	453.59 Grams
1 Pound	=	14.583 Troy Ounces
24 Karats	=	100% Gold
18 Karats	=	75% Gold
14 Karats	=	58.33% Gold
10 Karats	=	41.66% Gold

Solders

COMPOSITION	MELTING RANGE	
	SOLIDUS	LIQUIDUS
Sn96	221°C	221°C
Sn70	182°C	193°C
Sn63	182°C	182°C
Sn62	176°C	189°C
Sn60	182°C	190°C
Sn50	182°C	215°C
Sn40	182°C	238°C
Sn35	182°C	246°C
Sn30	182°C	254°C
Sn20	182°C	276°C
Sn10	267°C	299°C
Sn5	308°C	312°C
Sb5	232°C	240°C
Pb80	182°C	276°C
Pb70	182°C	254°C
Pb65	182°C	246°C
Ag1.5	309°C	309°C
Ag2.5	304°C	304°C
Ag5.5	304°C	365°C
Gold Germanium (88/12)	356°C	356°C
Gold Tin (80/20)	280°C	280°C
Indium (100%)	157°C	157°C

Material Properties

MATERIAL	ELECTRICAL CONDUCTIVITY (Siemens/m)
Aluminum	3.538×10^7
Beryllium	2.256×10^7
Brass (66%Cu, 34%Zn)	2.564×10^7 (converted from resistivity)
Carbon (graphite)	1.276×10^5
Chrome	5.104×10^6
Copper	5.800×10^7
Gold	4.257×10^7
Indium	1.392×10^7
Lead	4.872×10^6
Nickel	1.462×10^7
Palladium	9.280×10^6
Platinum	9.442×10^6
Rhodium	2.227×10^7
Silver	6.090×10^7
Tin	8.700×10^6
Tin Lead Solder (63/37)	7.284×10^6 (estimated)
Titanium	1.276×10^6
Titanium Tungsten (TiW)	1.652×10^7 (estimated)
Tungsten	1.821×10^7

Copper Thickness Conversion

COPPER OUNCES	THICKNESS	
½ Ounce	0.7 Mils	17.78 Microns
1 Ounce	1.4 Mils	35.56 Microns
2 Ounces	2.8 Mils	71.12 Microns
3 Ounces	4.2 Mils	106.68 Microns

Other Conversions

EQUIVALENTS

1 Micron	=	39.37 Microinches
1 Micron	=	10,000 Angstroms
1 Micron	=	1,000 Nanometers
25.4 Microns	=	1 Mil
1 Angstrom	=	0.003937 Microinches
1 Angstrom	=	0.0001 Microns
10 Angstroms	=	0.03937 Microinches = 1 Nanometer
50 Angstroms	=	0.1968 Microinches = 60/40 Optical
254 Angstroms	=	1 Microinch
100 Nanometers	=	3.937 Microinches
100 Nanometers	=	1,000 Angstroms
1 Nanometer	=	10 Angstroms
1 Microinch	=	254 Angstroms
1 Microinch	=	25.4 Nanometers
39.37 Microinches	=	1 Micron
1 Mil	=	25.4 Microns

TO GET		MULTIPLY		BY
Angstroms	=	Microns	x	10,000
Angstroms	=	Microinches	x	254
Angstroms	=	Mils	x	25,400
Angstroms	=	Nanometers	x	10
Microns	=	Nanometers	x	0.001
Microns	=	Angstroms	x	0.0001
Microns	=	Microinches	x	0.0254
Microns	=	Mils	x	25.4
Microns	=	Millimeters	x	0.01
Nanometers	=	Microns	x	1000
Nanometers	=	Mils	x	0.03937
Nanometers	=	Microinches	x	25.4
Nanometers	=	Angstroms	x	0.10
Millimeters	=	Microns	x	0.001
Millimeters	=	Mils	x	0.0254
Millimeters	=	Microinches	x	0.0000254
Millimeters	=	Inches	x	25.4
Centimeters	=	Inches	x	2.54
Centimeters	=	Millimeters	x	10
Microinches	=	Microns	x	39.37
Microinches	=	Mils	x	1000
Microinches	=	Angstroms	x	0.003937
Microinches	=	Nanometers	x	0.03937
Microinches	=	Millimeters	x	39.373
Mils	=	Microns	x	0.03937
Mils	=	Microinches	x	0.001
Mils	=	Angstroms	x	254,000
Mils	=	Millimeters	x	39.37
Inches	=	Millimeters	x	0.03937
Inches	=	Centimeters	x	0.3937
Sq. Inches	=	Sq. Centimeters	x	0.15499
Sq. Centimeters	=	Sq. Inches	x	6.45
Cu. Inches	=	Cu. Centimeters	x	0.06102
Cu. Centimeters	=	Cu. Inches	x	16.39
Ounces	=	Grams	x	0.03527
Pounds	=	Kilograms	x	2.2046
Grams	=	Ounces	x	28.349
Kilograms	=	Pounds	x	0.4536