Thermal Conductivity of Metals, Metallic Elements and Alloys

Thermal conductivity of common metals, metallic elements aand Alloys

Thermal Conductivity - *k* - is the quantity of heat transmitted due to an unit temperature gradient, in unit time under steady conditions in a direction normal to a surface of the unit area. Thermal Conductivity - *k* - is used in the Fourier's equation .

- Calculate Conductive Heat Transfer
- Calculate Overall Heat Transfer Coefficient

Metal, Metallic Element or Alloy	Temperature - *t* - (°C) (K) (°F)	Thermal Conductivity - *k* - (W/m K) (Btu/(ft h °F))
Aluminum	-73	237
"	0	236
"	127	240
"	327	232
"	527	220
Aluminum - Duralumin (94-96% Al, 3-5% Cu, trace Mg)	20	164
Aluminum - Silumin (87% Al, 13% Si)	20	164
Aluminum bronze	0 - 25	70
Aluminum alloy 3003, rolled	0 - 25	190
Aluminum alloy 2014. annealed	0 - 25	190
Aluminum alloy 360	0 - 25	150
Antimony	-73	30.2
"	0	25.5
"	127	21.2
"	327	18.2
"	527	16.8
Beryllium	-73	301
"	0	218
"	127	161
"	327	126
"	527	107
"	727	89
"	927	73
Beryllium copper 25	0 - 25	80
Bismuth	-73	9.7
"	0	8.2

Metal, Metallic Element or Alloy	Temperature - t - (°C) (K) (°F)	Thermal Conductivity - k - (W/m K) (Btu/(ft h °F))
Boron	-73	52.5
"	0	31.7
"	127	18.7
"	327	11.3
"	527	8.1
"	727	6.3
"	927	5.2
Cadmium	-73	99.3
"	0	97.5
"	127	94.7
Cesium	-73	36.8
"	0	36.1
Chromium	-73	111
"	0	94.8
"	127	87.3
"	327	80.5
"	527	71.3
"	727	65.3
"	927	62.4
Cobalt	-73	122
"	0	104
"	127	84.8
Copper	-73	413
"	0	401
"	127	392
"	327	383
"	527	371
"	727	357
"	927	342
Copper, electrolytic (ETP)	0 - 25	390
Copper - Admiralty Brass	20	111
Copper - Aluminum Bronze (95% Cu, 5% Al)	20	83
Copper - Bronze (75% Cu, 25% Sn)	20	26
Copper - Brass (Yellow Brass) (70% Cu, 30% Zn)	20	111
Copper - Cartridge brass (UNS C26000)	20	120
Copper - Constantan (60% Cu, 40% Ni)	20	22.7
Copper - German Silver (62% Cu, 15% Ni, 22% Zn)	20	24.9
Copper - Phosphor bronze (10% Sn, UNS C52400)	20	50
Copper - Red Brass (85% Cu, 9% Sn, 6%Zn)	20	61
Cupronickel	20	29
Germanium	-73	96.8
"	0	66.7
"	127	43.2
"	327	27.3
"	527	19.8
"	727	17.4
"	927	17.4
Gold	-73	327

Metal, Metallic Element or Alloy	Temperature - t - (°C) (K) (°F)	Thermal Conductivity - k - (W/m K) (Btu/(ft h °F))
"	0	318
"	127	312
"	327	304
"	527	292
"	727	278
"	927	262
Hafnium	-73	24.4
"	0	23.3
"	127	22.3
"	327	21.3
"	527	20.8
"	727	20.7
"	927	20.9
Hastelloy C	0 - 25	12
Inconel	21 - 100	15
Incoloy	0 – 100	12
Indium	-73	89.7
"	0	83.7
"	127	75.5
Iridium	-73	153
"	0	148
"	127	144
"	327	138
"	527	132
"	727	126
"	927	120
Iron	-73	94
"	0	83.5
"	127	69.4
"	327	54.7
"	527	43.3
"	727	32.6
"	927	28.2
Iron - Cast	20	52
Iron - Nodular pearlitic	100	31
Iron - Wrought	20	59
Lead	-73	36.6
"	0	35.5
"	127	33.8
"	327	31.2
Chemical lead	0 - 25	35
Antimonial lead (hard lead)	0 - 25	30
Lithium	-73	88.1
"	0	79.2
"	127	72.1
Magnesium	-73	159
"	0	157
"	127	153
"	327	149
"	527	146

Metal, Metallic Element or Alloy	Temperature - t - (°C) (K) (°F)	Thermal Conductivity - k - (W/m K) (Btu/(ft h °F))
Magnesium alloy AZ31B	0 - 25	100
Manganese	-73	7.17
"	0	7.68
Mercury	-73	28.9
Molybdenum	-73	143
"	0	139
"	127	134
"	327	126
"	527	118
"	727	112
"	927	105
Monel	0 – 100	26
Nickel	-73	106
"	0	94
"	127	80.1
"	327	65.5
"	527	67.4
"	727	71.8
"	927	76.1
Nickel - Wrought	0 – 100	61 – 90
Cupronickel 50 -45 (Constantan)	0 - 25	20
Niobium (Columbium)	-73	52.6
"	0	53.3
"	127	55.2
"	327	58.2
"	527	61.3
"	727	64.4
"	927	67.5
Osmium	20	61
Palladium		75.5
Platinum	-73	72.4
"	0	71.5
"	127	71.6
"	327	73.0
"	527	75.5
"	727	78.6
"	927	82.6
Plutonium	20	8.0
Potassium	-73	104
"	0	104
"	127	52
Red brass	0 - 25	160
Rhenium	-73	51
"	0	48.6
"	127	46.1
"	327	44.2
"	527	44.1
"	727	44.6
"	927	45.7
Rhodium	-73	154

Metal, Metallic Element or Alloy	Temperature - t - (°C) (K) (°F)	Thermal Conductivity - k - (W/m K) (Btu/(ft h °F))
"	0	151
"	127	146
"	327	136
"	527	127
"	727	121
"	927	115
Rubidium	-73	58.9
"	0	58.3
Selenium	20	0.52
Silicon	-73	264
"	0	168
"	127	98.9
"	327	61.9
"	527	42.2
"	727	31.2
"	927	25.7
Silver	-73	403
"	0	428
"	127	420
"	327	405
"	527	389
"	727	374
"	927	358
Sodium	-73	138
"	0	135
Solder 50 - 50	0 - 25	50
Steel - Carbon, 0.5% C	20	54
Steel - Carbon, 1% C	20	43
Steel - Carbon, 1.5% C	20	36
"	400	36
"	122	33
Steel - Chrome, 1% Cr	20	61
Steel - Chrome, 5% Cr	20	40
Steel - Chrome, 10% Cr	20	31
Steel - Chrome Nickel, 15% Cr, 10% Ni	20	19
Steel - Chrome Nickel, 20% Cr, 15% Ni	20	15.1
Steel - Hastelloy B	20	10
Steel - Hastelloy C	21	8.7
Steel - Nickel, 10% Ni	20	26
Steel - Nickel, 20% Ni	20	19
Steel - Nickel, 40% Ni	20	10
Steel - Nickel, 60% Ni	20	19
Steel - Nickel Chrome, 80% Ni, 15% Ni	20	17
Steel - Nickel Chrome, 40% Ni, 15% Ni	20	11.6
Steel - Manganese, 1% Mn	20	50
Steel - Stainless, Type 304	20	14.4
Steel - Stainless, Type 347	20	14.3
Steel - Tungsten, 1% W	20	66
Steel - Wrought Carbon	0	59
Tantalum	-73	57.5

Metal, Metallic Element or Alloy	Temperature - t - (°C) (K) (°F)	Thermal Conductivity - k - (W/m K) (Btu/(ft h °F))
"	0	57.4
"	127	57.8
"	327	58.9
"	527	59.4
"	727	60.2
"	927	61
Thorium	20	42
Tin	-73	73.3
"	0	68.2
"	127	62.2
Titanium	-73	24.5
"	0	22.4
"	127	20.4
"	327	19.4
"	527	19.7
"	727	20.7
"	927	22
Tungsten	-73	197
"	0	182
"	127	162
"	327	139
"	527	128
"	727	121
"	927	115
Uranium	-73	25.1
"	0	27
"	127	29.6
"	327	34
"	527	38.8
"	727	43.9
"	927	49
Vanadium	-73	31.5
"	0	31.3
"	427	32.1
"	327	34.2
"	527	36.3
"	727	38.6
"	927	41.2
Zinc	-73	123
"	0	122
"	127	116
"	327	105
Zirconium	-73	25.2
"	0	23.2
"	127	21.6
"	327	20.7
"	527	21.6
"	727	23.7
"	927	25.7

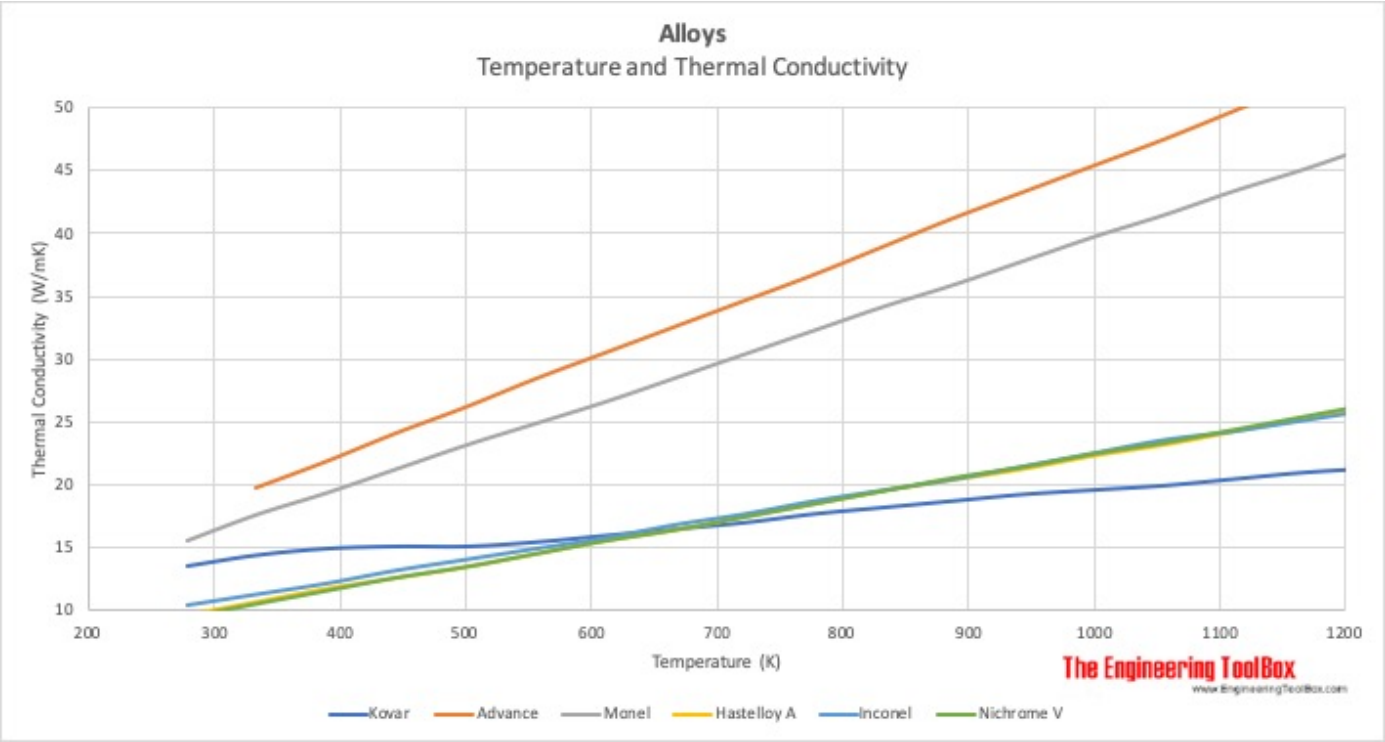
- Thermal Conductivity Online Converter

Alloys - Temperature and Thermal Conductivity

Temperature and thermal conductivity for

- Hastelloy A
- Inconel
- Nichrome V
- Kovar
- Advance
- Monel

alloys:



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Related Documents

- **Aluminum - Radiation Heat Emissivity** - Radiation heat emissivity of unoxidized, oxidized and polished aluminum
- **Aluminum Alloys - Mechanical Properties** - Mechanical properties of aluminum alloys - tensile strength, yield strength and more
- **Butane - Thermal Conductivity** - Online calculators, figures and tables showing thermal conductivity of liquid and gaseous butane, C_4H_{10}, at varying temperarure and pressure, SI and Imperial units

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- **Electrode Potential and Galvanic Corrosion** - Introduction to electro chemical series and corrosion of metals
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- **Propane - Thermal Conductivity** - Online calculator, figures and tables showing thermal conductivity of liquid and gaseous propane at varying temperarure and pressure, SI and Imperial units
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- **Thermal Conductivity Conversion Factors** - Convert between thermal conductivity units
- **Thermal Conductivity of some selected Materials and Gases** - Thermal conductivity of some selected gases, insulation products, aluminum, asphalt, brass, copper, steel and other common materials
- **Thermal Conductivity Online Converter** - Convert thermal conductivities
- **Thermal Expansion of Metals** - Thermal expansion of some common metals
- **Thermal Resistivity and Conductivity** - Thermal resistivity and conductivity

- **Water - Thermal Conductivity** - Figures and tables showing thermal conductivity of water (liquid and gas phase) with varying temperature and pressure, SI and Imperial units

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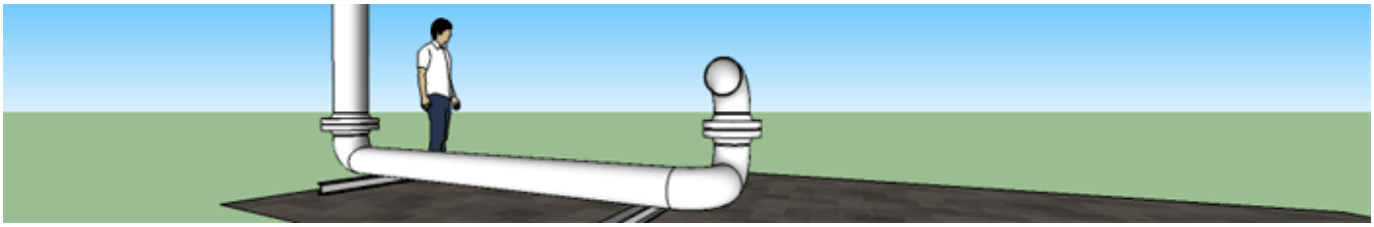

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