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Thermal Conductivity of some common Materials and Gases

Thermal conductivity of some common materials and gases - insulation, aluminum, asphalt, brass, copper, steel and many more ..



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Thermal conductivity is the quantity of heat transmitted through a unit thickness in a direction normal to a surface of unit area, due to a unit temperature gradient under steady state conditions.

Thermal conductivity of some common materials and products are indicated in the table below.

• $1 W/(m.K) = 1 W/(m.^{\circ}C) = 0.85984 kcal/(hr.m.^{\circ}C) = 0.5779 Btu/(ft.hr.^{\circ}F)$

Material/Substance	Temperature - $^{\circ}C$		
	25	125	225
Acetone	0.16		
Acetylene (gas)	0.018		
Acrylic	0.2		
Air, atmosphere (gas)	0.024		
Alcohol	0.17		
Aluminum	250	255	250
Aluminum Oxide	30		
Ammonia (gas)	0.022		
Antimony	18.5		
Argon (gas)	0.016		
Asbestos-cement board	0.744		
Asbestos-cement sheets	0.166		
Asbestos-cement	2.07		
Asbestos, loosely packed	0.15		
Asbestos mill board	0.14		
Asphalt	0.75		
Balsa wood	0.048		
Bitumen	0.17		
Benzene	0.16		
Beryllium	218		
Bitumen	0.17		
Blast furnace gas (gas)	0.02		
Brass	109		
Breeze block	0.10 - 0.20		
Brick dense	1.31		
Brickwork, common	0.6 - 1.0		
Brickwork, dense	1.6		
Cadmium	92		
Calcium silicate	0.05		
Carbon	1.7		
Carbon dioxide (gas)	0.0146		
Cement, portland	0.29		
Cement, mortar	1.73		
Chalk	0.09		
Chlorine (gas)	0.0081		
Chrome Nickel Steel (18% Cr, 8 % Ni)	16.3		
Clay, dry to moist	0.15 - 1.8		
Clay, saturated	0.6 - 2.5		
Cobalt	69		
Concrete, lightweight	0.1 - 0.3		
Concrete, medium	0.4 - 0.7		
Concrete, dense	1.0 - 1.8		
Concrete, stone	1.7		

Unit Converter

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Engineering Standards



Constantan	22		
Copper	401	400	398
Corian (ceramic filled)	1.06		
Corkboard	0.043		
Cork, regranulated	0.044		
Cork	0.07		
Cotton wool	0.029		
Carbon Steel	54	51	47
Cotton Wool insulation	0.029		
Diatomaceous earth (Sil-o-cel)	0.06		
Diatomite	0.12		
Earth, dry	1.5		
Engine Oil	0.15		
Ether	0.14		
Ethylene (gas)	0.017		
Epoxy	0.35		
Ethylene glycol	0.25		
Felt insulation	0.04		
Fiberglass	0.04		
Fiber insulating board	0.048		
Fiber hardboard	0.2		
Fireclay brick 500°C	1.4		
Foam glass	0.045		
Freon 12 (gas)	0.073		
Freon (liquid)	0.07		
Gasoline	0.15		
Glass	1.05		
Glass, Pearls, dry	0.18		
Glass, Pearls, saturated	0.76		
Glass, window	0.96		
Glass, wool Insulation	0.04		
Glycerol	0.28		
Gold	310	312	310
Granite	1.7 - 4.0		
Gravel	0.7		
Gypsum or plaster board	0.17		
Hairfelt	0.05		
Hardboard high density	0.15		
Hardwoods (oak, maple..)	0.16		
Helium (gas)	0.142		
Hydrochlor acid (gas)	0.013		
Hydrogen (gas)	0.168		
Hydrogen sulfide (gas)	0.013		
Ice (0°C, 32°F)	2.18		
Insulation materials	0.035 - 0.16		
Iridium	147		
Iron	80	68	60
Iron, wrought	59		
Iron, cast	55		
Kapok insulation	0.034		
Kerosene	0.15		
Krypton (gas)	0.0088		
Lead Pb	35		
Leather, dry	0.14		
Limestone	1.26 - 1.33		
Magnesia insulation (85%)	0.07		
Magnesite	4.15		
Magnesium	156		
Marble	2.08 - 2.94		
Mercury	8		
Methane (gas)	0.030		
Methanol	0.21		
Mica	0.71		
Mineral wool insulation materials, wool blankets ..	0.04		
Molybdenum	138		
Monel	26		
Neon (gas)	0.046		
Nickel	91		
Nitrogen (gas)	0.024		

Engineering Standards



Nylon 6	0.25		
Oil, machine lubricating SAE 50	0.15		
Olive oil	0.17		
Oxygen (gas)	0.024		
Paper	0.05		
Paraffin Wax	0.25		
Perlite, atmospheric pressure	0.031		
Perlite, vacuum	0.00137		
Plaster, gypsum	0.48		
Plaster, metal lath	0.47		
Plaster, wood lath	0.28		
Plastics, foamed (insulation materials)	0.03		
Platinum	70	71	72
Plywood	0.13		
Polyethylene HD	0.42 - 0.51		
Polypropylene	0.1 - 0.22		
Polystyrene, expanded	0.03		
Polystyrol	0.043		
Polyurethane foam	0.03		
Porcelain	1.5		
Propane (gas)	0.015		
PTFE	0.25		
PVC	0.19		
Pyrex glass	1.005		
Quartz mineral	3		
Rock, solid	2 - 7		
Rock, porous volcanic (Tuff)	0.5 - 2.5		
Rock Wool insulation	0.045		
Rubber, natural	0.13		
Sand, dry	0.15 - 0.25		
Sand, moist	0.25 - 2		
Sand, saturated	2 - 4		
Sandstone	1.7		
Sawdust	0.08		
Silica aerogel	0.02		
Silicone oil	0.1		
Silver	429		
Slag wool	0.042		
Slate	2.01		
Snow (temp < 0°C)	0.05 - 0.25		
Sodium	84		
Softwoods (fir, pine ..)	0.12		
Soil, with organic matter	0.15 - 2		
Soil, saturated	0.6 - 4		
Steel, Carbon 1%	43		
Stainless Steel	16	17	19
Straw slab insulation, compressed	0.09		
Styrofoam	0.033		
Sulfur dioxide (gas)	0.0086		
Tin Sn	67		
Zinc Zn	116		
Urethane foam	0.021		
Vermiculite	0.058		
Vinyl ester	0.25		
Water	0.58		
Water, vapor (steam)		0.016	
Wood across the grain, white pine	0.12		
Wood across the grain, balsa	0.055		
Wood across the grain, yellow pine, timber	0.147		
Wood, oak	0.17		
Wool, felt	0.07		
Wood wool, slab	0.1 - 0.15		
Xenon (gas)	0.0051		

• $1 \text{ W/(m.K)} = 1 \text{ W/(m.}^\circ\text{C)} = 0.85984 \text{ kcal/(h.m.}^\circ\text{C)} = 0.5779 \text{ Btu/(ft.h.}^\circ\text{F)} = 0.048 \text{ Btu/(in.h.}^\circ\text{F)}$

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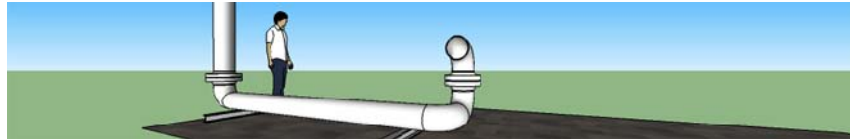
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Related Documents

- [Calcium Silicate Insulation](#) - Thermal conductivity - temperature and k-values
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- [Cylinder or Pipe - Conductive Heat Loss](#) - Conductive heat loss through cylinder or pipe walls
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