

Material	°F	°C	Emissivity
ALLOYS: 20-Ni, 24-CR, 55-FE, Oxid.	392	200	0.9
20-Ni, 24-CR, 55-FE, Oxid..	932	500	0.97
60-Ni , 12-CR, 28-FE,	518	270	0.89
60-Ni , 12-CR, 28-FE..	1040	560	0.82
80-Ni, 20-CR, Oxidized	212	100	0.87
80-Ni, 20-CR, Oxidized	1112	600	0.87
80-Ni, 20-CR, Oxidized	2372	1300	0.89
ALUMINUM: Unoxidized	77	25	0.02
Unoxidized	212	100	0.03
Unoxidized	932	500	0.06
Oxidized	390	199	0.11
Oxidized	1110	599	0.19
Oxidized at 599°C	390	199	0.2
Oxidized at 599°C	1110	599	0.31
Heavily Oxidized	200	93	0.09
Heavily Oxidized	940	504	0.18
Highly Polished	212	100	0.09
Roughly Polished	212	100	0.04
Commercial Sheet	212	100	0.06
Highly Polished Plate	440	227	0.04
Highly Polished Plate	1070	577	0.05
Bright Rolled Plate	338	170	0.04
Bright Rolled Plate	932	500	0.05
Alloy A3003, Oxidized	600	316	0.4
Alloy A3003, Oxidized	900	482	0.4
Alloy 1100-0	200-800	93-427	0.05
Alloy 24ST	75	24	0.09
Alloy 24ST, Polished	75	24	0.09
Alloy 75ST	75	24	0.11
Alloy 75ST, Polished	75	24	0.08
Alloy 75ST, Polished	176	80	0.34
Bismuth, Unoxidized	77	25	0.05
Bismuth, Unoxidized	212	100	0.06
BRASS: 73% Cu, 27% Zn, Polished	476	247	0.03
73% Cu, 27% Zn, Polished	674	357	0.03
62% Cu, 37% Zn, Polished	494	257	0.03
62% Cu, 37% Zn, Polished	710	377	0.04
83% Cu, 17% Zn, Polished	530	277	0.03
MATT	68	20	0.07
Burnished to Brown Colour	68	20	0.4
Cu-Zn, Brass Oxidized	392	200	0.61
Cu-Zn, Brass Oxidized	752	400	0.6
Cu-Zn, Brass Oxidized	1112	600	0.61
Unoxidized	77	25	0.04
Unoxidized	212	100	0.04
Cadmium	77	25	0.02
CARBON: Lampblack	77	25	0.95
Unoxidized	77	25	0.81
Unoxidized	212	100	0.81
Unoxidized	932	500	0.79
Candle Soot	250	121	0.95
Filament	500	260	0.95
Graphitized	212	100	0.76
Graphitized	572	300	0.75

Material	°F	°C	Emissivity
Graphitized	932	500	0.71
Chromium	100	38	0.08
Chromium	1000	538	0.26
Chromium, Polished	302	150	0.06
Cobalt, Unoxidized	932	500	0.13
Cobalt, Unoxidized	1832	1000	0.23
Columbium, Unoxidized	1500	816	0.19
Columbium, Unoxidized	2000	1093	0.24
COPPER: Cuprous Oxide	100	38	0.87
Cuprous Oxide	500	260	0.83
Cuprous Oxide	1000	538	0.77
Black, Oxidized	100	38	0.78
Etched	100	38	0.09
Matte	100	38	0.22
Roughly Polished	100	38	0.07
Polished	100	38	0.03
Highly Polished	100	38	0.02
Rolled	100	38	0.64
Rough	100	38	0.74
Molten	1000	538	0.15
Molten	1970	1077	0.16
Molten	2230	1221	0.13
Nickel Plated	100-500	38-260	0.37
Dow Metal	0.4-600	-334	0.15
GOLD: Enamel	212	100	0.37
Plate on .0005 Silver	200-750	93-399	.11-.14
Plate on .0005 Nickel	200-750	93-399	.07-.09
Polished	100-500	38-260	0.02
Polished	1000-2000	538-1093	0.03
HAYNES ALLOY C: Oxidized	600-2000	316-1093	.90-.96
HAYNES ALLOY 25: Oxidized	600-2000	316-1093	.86-.89
HAYNES ALLOY X: Oxidized	600-2000	316-1093	.85-.89
Inconel Sheet	1000	538	0.28
Inconel Sheet	1200	649	0.42
Inconel Sheet	1400	760	0.58
Inconel X, Polished	75	24	0.19
Inconel B, Polished	75	24	0.21
IRON: Oxidized	212	100	0.74
Oxidized	930	499	0.84
Oxidized	2190	1199	0.89
Unoxidized	212	100	0.05
Red Rust	77	25	0.7
Rusted	77	25	0.65
Liquid	2760-3220	1516-1771	.42-.45
CAST IRON: Oxidized	390	199	0.64
Oxidized	1110	599	0.78
Oxidized	212	100	0.21
Strong Oxidation	40	104	0.95
Strong Oxidation	482	250	0.95
Liquid	2795	1535	0.29
WROUGHT IRON: Dull	77	25	0.29
Dull	660	349	0.94
Smooth	100	38	0.94
Polished	100	38	0.35
LEAD: Polished	100-500	38-260	0.28
Rough	100	38	.07--.13

Material	°F	°C	Emissivity
Oxidized	100	38	.16-.20
Oxidized at 1100°F	100	38	0.9
Gray Oxidized	100	38	0.1
Magnesium	100-500	38-260	0.1
Magnesium Oxide	1880-3140	1027-1727	0.12
Mercury	32	0	0.09
	77	25	.10
	212	100	.12
			Oxidized at 1000°F
Oxidized at 1000°F	700	371	.84
			Oxidized at 1000°F
Oxidized at 1000°F	900	482	.83
			Oxidized at 1000°F
Monel, Ni-Cu	392	200	0.41
Monel, Ni-Cu	752	400	0.44
Monel, Ni-Cu	1112	600	0.46
Monel, Ni-Cu Oxidized	68	20	0.43
Monel, Ni-Cu Oxid. at 1110°F	1110	599	0.46
NICKEL: Polished	100	38	0.05
Oxidized	100-500	38-260	.31-.46
Unoxidized	77	25	0.05
Unoxidized	212	100	0.06
Unoxidized	932	500	0.12
Unoxidized	1832	100	0.19
Electrolytic	100	38	0.04
Electrolytic	500	260	0.06
Electrolytic	1000	538	0.1
Electrolytic	2000	1093	0.16
Nickel Oxide	1000-2000	538-1093	.59-.86
Palladium Plate (.00005 on .0005 silver)	200-750	38	.16-.17
Platinum	100	38	0.05
Platinum	500	260	0.05
Platinum	100	538	0.1
Platinum, Black	100	38	0.93
Platinum, Black	500	260	0.96
Platinum, Black	2000	1093	0.97
Oxidized at 1100°F	500	260	.07
			Oxidized at 1100°F
Rhodium Flash (0.0002on 0.0005 Ni)	200-700	93-371	.10-.18
SILVER: Plate (0.0005 on Ni)	200-700	93-371	.06-.07
Polished	100	38	0.01
Polished	500	260	0.02
Polished	1000	538	0.03
Polished	2000	1093	0.03
STEEL: Cold Rolled	200	93	.75-.85
Ground Sheet?	1720-2010	938-1099	.55-.61
Polished Sheet	100	38	0.07
Polished Sheet	500	260	0.1
Polished Sheet	1000	538	0.14
Mild Steel, Polished	75	24	0.1
Mild Steel, Smooth	75	24	0.12

Material	°F	°C	Emissivity
Mild Steel, Liquid	2910-3270	1599-1793	0.28
Steel, Unoxidized	212	100	0.08
Steel, Oxidized	77	25	0.8
STEEL ALLOYS: Type 301, Polished	75	24	0.27
Type 301, Polished	450	232	0.57
Type 301, Polished	1740	949	0.55
Type 303, Oxidized?600-2000	600-2000	316-1093	.74-.87
Type 310, Rolled?1500-2100	1500-2100	816-1149	.56-.81
Type 316, Polished	75	24	0.28
Type 316, Polished	450	232	0.57
Type 316, Polished	1740	949	0.66
Type 321	200-800	93-427	.27-.32
Type 321	300-1500	149-815	.18-.49
Type 321 w/BK Oxide	200-800	93-316	.66-.76
Type 347, Oxidized	600-2000	149-815	.87-.91
Type 350	200-800	316-1093	.18-.27
Type 350 Polished	300-1800	149-982	.11-.35
Type 446	300-1500	149-815	.15-.37
Type 17-7 PH	200-600	93-316	.44-.51
Type 17-7 PH Polished	300-1500	149-815	.09-.16
Type C1020, Oxidized	600-2000	316-1093	.87-.91
Type PH-15-7 MO	300-1200	149-649	.07-.19
Tantalum, Unoxidized	1340	727	0.14
Tantalum, Unoxidized	2000	1093	0.19
Tantalum, Unoxidized	3600	1982	0.26
Tantalum, Unoxidized	5306	2930	0.3
Tin, Unoxidized	77	25	0.04
Tin, Unoxidized	212	100	0.05
Tinned Iron Bright	76	24	0.05
Tinned Iron Bright	212	100	0.08
Titanium Alloy c110M Polished	300-1200	149-649	.08-.19
Oxidized at 538°C (1000°F)	200-800	93-427	.51-.61
			Oxidized at 538°C (1000°F)
Anodized into SS	200-600	93-316	.96-.82
TUNGSTEN: Unoxidized	77	25	0.02
Tungsten Unoxidized	212	100	0.03
Tungsten Unoxidized	932	500	0.07
Tungsten Unoxidized	1832	1000	0.15
Tungsten Unoxidized	2732	1500	0.23
Tungsten Unoxidized	3632	2000	0.28
Filament (Aged)	100	38	0.03
Filament (Aged)	1000	583	0.11
Filament (Aged)	5000	2760	0.35
Uranium Oxide	1880	1027	0.79
ZINC: Bright Galvanized	100	38	0.23
Commercial 99.1%	500	260	0.05
Galvanized	100	38	0.28
Oxidized	500-1000	260-538	0.11
Polished	100	38	0.02
Polished	500	260	0.03
Polished	1000	538	0.04
Polished	2000	1093	0.06

Material	°F	°C	Emissivity
Adobe	68	20	0.9
Asbestos			
Board	100	38	0.96
Cement	32-392	0-200	0.96
Cement, Red	2500	1371	0.67
Cement, White	2500	1317	0.65
Cloth	199	93	0.9
Paper	100-700	38-371	0.93
Slate	68	20	0.72
Asphalt, pavement	100	38	0.93
Asphalt, tar paper	68	20	0.93
Basalt	68	20	0.72
Brick			
Red, rough	70	21	0.93
Gault Cream	2500-5000	1371-2760	.26-.30
Fire Clay	2500	1371	0.75
Lime Clay	2500	1371	0.43
Fire Brick	1832	100	.75-.80
Magnesite, Refractory	1832	1000	0.38
Gray Brick	2021	1100	0.75
Silica, Glazed	2000	1093	0.88
Silica, Unglazed	2000	1093	0.8
Sandlime	2500-5000	1371-2760	.59-.63
Carborundum	1850	1010	0.92
Ceramic			
Alumina on Inconel	800-2000	427-1093	.69-.45
Earthenware, Glazed	70	21	0.9
Earthenware, Matte	70	21	0.93
Greens No. 5210-2C	200-750	93-399	.89-.82
Coating No. C20A	200-750	93-399	.73-.80
Porcelain	72	22	0.92
White Al2O3	200	93	0.9
Zirconia on Inconel	800-2000	427-1093	.62-.45
Clay	68	20	0.39
Fired	158	70	.91 Shale
Tiles, Light Red	2500-5000	1371-2760	.32-.34 Tiles, Dark Purple
Concrete			
Rough	32-2000	0-1093	0.94
Tiles, Natural	2500-5000	1371-2760	.63-.62
Brown	2500-5000	1371-2760	.87-.83 Black
Cotton Cloth	68	20	0.77
Dolomite Lime	68	20	0.41
Emery Corundum	176	80	0.86
Glass			
Convex D	212	100	0.8
Convex D	600	316	0.82
Convex D	932	500	0.76

Material	°F	°C	Emissivity
Nonex	212	100	0.82
Nonex	939	500	0.76
Smooth	32-200	0-93	.92-.94
Granite	70	21	0.45
Gravel	100	38	0.28
Gypsum	68	20	.80-.90
Ice, Smooth	32	0	0.97
Ice, Rough	32	0	0.98
Lacquer			
Black	200	93	0.96
Blue, on Al Foil	100	38	0.78
Clear, on Al Foil (2 coats)	200	93	.08 (.09)
Clear, on Bright Cu	200	93	0.66
Clear, on Tarnished Cu	200	93	0.64
Red, on Al Foil (2 coats)	200	93	.61 (.74)
White	200	93	0.95
White, on Al Foil (2 coats)	100	38	.69 (.88)
Yellow, on Al Foil (2 coats)	100	38	.57 (.79)
Lime Mortar	100-500	38-260	.90-.92
Limestone	100	38	0.95
Marble, White	100	38	0.95
Smooth, White	100	38	.56 Polished Gray
Mica	100	38	0.75
Oil on Nickel			
0.001 Film	72	22	0.27
0.002 "	72	22	0.46
0.005 "	72	22	-0.72
Thick "	72	22	0.82
Oil, Linseed			
On Al Foil, uncoated	250	121	0.09
On Al Foil, 1 coat	250	121	0.56
On Al Foil, 2 coats	250	121	0.56
On Polished Iron, .001 Film	100	38	0.22
On Polished Iron, .002 Film	100	38	0.45
On Polished Iron, .004 Film	100	38	0.65
On Polished Iron, Thick Film	100	38	0.83
Paints			
Blue, Cu2O3	75	24	0.94
Black, CuO	75	24	0.96
Green, Cu2O3	75	24	0.92
Red, Fe2O3	75	24	0.91

Material	°F	°C	Emissivity
White, Al2O3	75	24	0.94
White, Y2O3	75	24	0.9
White, ZnO	75	24	0.95
White, MgCO3	75	24	0.91
White, ZrO2	75	24	0.95
White, ThO2	75	24	0.9
White, MgO	75	24	0.91
White, PbCO3	75	24	0.93
Yellow, PbO	75	24	0.9
Yellow, PbCrO4	75	24	0.93
Paints, Aluminium	100	38	.27-.67
10% Al	100	38	0.52
26% Al	100	38	0.3
Dow XP-310	200	93	0.22
Paints, Bronze	low	low	.34-.80
Gum Varnish (2 coats)	70	21	0.53
Gum Varnish (3 coats)	70	21	0.5
Cellulose Binder (2 coats)	70	21	0.34
Paints, Oil			
All colors	200	93	.92-.96
Black	200	93	0.92
Black Gloss	70	21	0.9
Camouflage Green	125	52	0.85
Flat Black	80	27	0.88
Flat White	80	27	0.91
Gray-Green	70	21	0.95
Green	200	93	0.95
Lamp Black	209	98	0.96
Red	200	93	0.95
White	200	93	0.94
Quartz, Rough, Fused	70	21	0.93
Glass, 1.98 mm	540	282	0.9
Glass, 1.98 mm	1540	838	0.41
Glass, 6.88 mm	540	282	0.93
Glass, 6.88 mm	1540	838	0.47
Opaque	570	299	0.92
Opaque	1540	838	0.68
Red Lead	212	100	0.93
Rubber, Hard	74	23	0.94
Rubber, Soft, Gray	76	24	0.86
Sand	68	20	0.76
Sandstone	100	38	0.67
Sandstone, Red	100	38	.60-.83
Sawdust	68	20	0.75
Shale	68	20	0.69
Silica, Glazed	1832	1000	0.85
Silica, Unglazed	2012	1100	0.75
Silicon Carbide	300-1200	149-649	.83-.96

Material	°F	°C	Emissivity
Silk Cloth	68	20	0.78
Slate	100	38	.67-.80
Snow, Fine Particles	20	-7	0.82
Snow, Granular	18	-8	0.89
Soil			
Surface	100	38	0.38
Black Loam	68	20	0.66
Plowed Field	68	20	0.38
Soot			
Acetylene	75	24	0.97
Camphor	75	24	0.94
Candle	250	121	0.95
Coal	68	20	0.95
Stonework	100	38	0.67
Water	100	38	0.67
Waterglass	68	20	0.96
Wood	low	low	.80-.90
Beech Planed	158	70	0.94
Oak, Planed	100	38	0.91