

Material	METALS					
	Emissivity					
	1 $\mu\text{m}$	1.6 $\mu\text{m}$	2.2 $\mu\text{m}$	3.9 $\mu\text{m}$	5 $\mu\text{m}$	8 – 14 $\mu\text{m}$
Aluminum						
Unoxidized	0.1-0.2	0.02-0.2	0.02-0.2	0.02-0.2	0.02-0.2	0.02-0.1
Oxidized	0.4	0.4	0.2-0.4	0.2-0.4	0.2-0.4	0.2-0.4
Alloy A3003,		0.4		0.4	0.4	0.3
Oxidized			0.4			
Roughened	0.2-0.8	0.2-0.6	0.2-0.6	0.1-0.4	0.1-0.4	0.1-0.3
Polished	0.1-0.2	0.02-0.1	0.02-0.1	0.02-0.1	0.02-0.1	0.02-0.1
Brass						
Polished	0.1-0.3	0.01-0.05	0.01-0.05	0.01-0.05	0.01-0.05	0.01-0.05
Burnished			0.4	0.3	0.3	0.3
Oxidized	0.6	0.6	0.6	0.5	0.5	0.5
Chromium						
	0.4	0.4	0.05-0.3	0.03-0.3	0.03-0.3	0.02-0.2
Copper						
Polished		0.03	0.03	0.03	0.03	0.03
Roughened		0.05-0.2	0.05-0.2	0.05-0.15	0.05-0.15	0.05-0.1
Oxidized	0.2-0.8	0.2-0.9	0.7-0.9	0.5-0.8	0.5-0.8	0.4-0.8
Gold						
	0.3	0.01-0.1	0.01-0.1	0.01-0.1	0.01-0.1	0.01-0.1
Haynes						
Alloy	0.5-0.9	0.6-0.9	0.6-0.9	0.3-0.8	0.3-0.8	0.3-0.8
Inconel						
Oxidized	0.4-0.9	0.6-0.9	0.6-0.9	0.6-0.9	0.6-0.9	0.7-0.95
Sandblasted	0.3-0.4	0.3-0.6	0.3-0.6	0.3-0.6	0.3-0.6	0.3-0.6
Electropolished	0.2-0.5	0.25	0.25	0.15	0.15	0.15
Iron						
Oxidized	0.4-0.8	0.5-0.8	0.7-0.9	0.6-0.9	0.6-0.9	0.5-0.9
Unoxidized	0.35	0.1-0.3	0.1-0.3	0.05-0.25	0.05-0.25	0.05-0.2
Rusted		0.6-0.9	0.6-0.9	0.5-0.8	0.5-0.8	0.5-0.7
Molten	0.35	0.4-0.6	0.4-0.6			
Iron, Cast						
Oxidized	0.7-0.9	0.7-0.9	0.7-0.9	0.65-0.95	0.65-0.95	0.6-0.95
Unoxidized	0.35	0.3	0.1-0.3	0.25	0.25	0.2
Molten	0.35	0.3-0.4	0.3-0.4	0.2-0.3	0.2-0.3	0.2-0.3
Iron, Wrought						
Dull	0.9	0.9	0.95	0.9	0.9	0.9
Lead						
Polished	0.35	0.05-0.2	0.05-0.2	0.05-0.2	0.05-0.2	0.05-0.1
Rough	0.65	0.6	0.5	0.4	0.4	0.4
Oxidized		0.3-0.7	0.3-0.7	0.2-0.7	0.2-0.7	0.2-0.6
Magnesium						
	0.3-0.8	0.05-0.3	0.05-0.2	0.03-0.15	0.03-0.15	0.02-0.1
Mercury						
		0.05-0.15	0.05-0.15	0.05-0.15	0.05-0.15	0.05-0.15
Molybdenum						
Oxidized	0.5-0.9	0.4-0.9	0.4-0.9	0.3-0.7	0.3-0.7	0.2-0.6
Unoxidized	0.25-0.35	0.1-0.35	0.1-0.3	0.1-0.15	0.1-0.15	0.1
Monel (Ni-Cu)						
	0.3	0.2-0.6	0.2-0.6	0.1-0.5	0.1-0.5	0.1-0.14

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Nickel						
Oxidized	0.8-0.9	0.4-0.7	0.4-0.7	0.3-0.6	0.3-0.6	0.2-0.5
Electrolytic	0.2-0.4	0.1-0.3	0.1-0.2	0.1-0.15	0.1-0.15	0.05-0.15
Platinum						
Black		0.95	0.95	0.9	0.9	0.9
Silver		0.02	0.02	0.02	0.02	0.02
Steel						
Cold-Rolled	0.8-0.9	0.8-0.9		0.8-0.9	0.8-0.9	0.7-0.9
Ground Sheet			0.6-0.7	0.5-0.7	0.5-0.7	0.4-0.6
Polished Sheet	0.35	0.25	0.2	0.1	0.1	0.1
Molten	0.35	0.25-0.4	0.25-0.4	0.1-0.2	0.1-0.2	
Oxidized	0.8-0.9	0.8-0.9	0.8-0.9	0.7-0.9	0.7-0.9	0.7-0.9
Stainless	0.35	0.2-0.9	0.2-0.9	0.15-0.8	0.15-0.8	0.1-0.8
Tin (Unoxidized)	0.25	0.1-0.3	0.1-0.3	0.05	0.05	0.05
Titanium						
Polished	0.5-0.75	0.3-0.5	0.2-0.5	0.1-0.3	0.1-0.3	0.05-0.2
Oxidized		0.6-0.8	0.6-0.8	0.5-0.7	0.5-0.7	0.5-0.6
Tungsten			0.1-0.6	0.05-0.5	0.05-0.5	0.03
Polished	0.35-0.4	0.1-0.3	0.1-0.3	0.05-0.25	0.05-0.25	0.03-0.1
Zinc						
Oxidized	0.6	0.15	0.15	0.1	0.1	0.1
Polished	0.5	0.05	0.05	0.03	0.03	0.02

**Tab. 14: Typical Emissivity Values**

Material	NON-METALS				
	Emissivity				
	1 $\mu\text{m}$	1.6 $\mu\text{m}$	2.2 $\mu\text{m}$	5 $\mu\text{m}$	8 – 14 $\mu\text{m}$
Asbestos	0.9		0.8	0.9	0.95
Asphalt				0.95	0.95
Basalt				0.7	0.7
Carbon					
Unoxidized	0.8-0.95		0.8-0.9	0.8-0.9	0.8-0.9
Graphite	0.8-0.9		0.8-0.9	0.7-0.9	0.7-0.8
Carborundum			0.95	0.9	0.9
Ceramic	0.4		0.8-0.95	0.8-0.95	0.95
Clay			0.8-0.95	0.85-0.95	0.95
Concrete	0.65		0.9	0.9	0.95
Cloth				0.95	0.95
Glass					
Plate			0.2	0.98	0.85
"Gov"			0.4-0.9	0.9	
Gravel				0.95	0.95
Gypsum				0.4-0.97	0.8-0.95
Ice					0.98
Limestone				0.4-0.98	0.98
Paint (non-al.)					0.9-0.95
Paper (any color)				0.95	0.95
Plastic, opaque at 500 $\mu\text{m}$ thickness (20 mils)				0.95	0.95
Rubber				0.9	0.95
Sand				0.9	0.9
Snow					0.9
Soil					0.9-0.98
Water					0.93
Wood, Natural				0.9-0.95	0.9-0.95