

Emissivity Table for Metals

In the table below, please use the 8-14 micron column if you have an MT, ST, or L. Please check your user manual if you own a 3i to determine the correct column to use.

Note: These emissivities values are "approximate" and may vary depending on the actual material and conditions.

Material	Emissivity		
	1.0µm	1.6µm	8-14µm
Aluminum			
Unoxidized	0.1-0.2	0.02-0.2	n.r.
Oxidized	0.4	0.4	0.2-0.4
Alloy A3003			
Oxidized	n.r.	0.4	0.3
Roughened	0.2-0.8	0.2-0.6	0.1-0.3
Polished	0.1-0.2	0.02-0.1	n.r.
Brass			
Polished	0.8-0.95	0.01-0.05	n.r.
Burnished	n.r.	n.r.	0.3
Oxidized	0.6	0.6	0.5
Chromium	0.4	0.4	n.r.
Copper			
Polished	n.r.	0.03	n.r.
Roughened	n.r.	0.05-0.2	n.r.
Oxidized	0.2-0.8	0.2-0.9	0.4-0.8
Electrical Terminal Blocks	n.r.	n.r.	0.6
Gold	0.3	0.01-0.1	n.r.
Haynes			
Alloy	0.5-0.9	0.6-0.9	0.3-0.8
Inconel			
Oxidized	0.4-0.9	0.6-0.9	0.7-.95
Sandblasted	0.3-0.4	0.3-0.6	0.3-0.6
Electropolished	0.2-0.5	0.25	0.15
Iron			
Oxidized	0.4-0.8	0.5-0.9	0.5-0.9
Unoxidized	0.35	0.1-0.3	n.r.

Rusted	n.r.	0.6-0.9	0.5-0.7
Molten	0.35	0.4-0.6	n.r.
Iron, Cast			
Oxidized	0.7-0.9	0.7-0.9	0.6-0.95
Unoxidized	0.35	0.3	0.2
Molten	.035	0.3-0.4	0.2-0.3
Iron, Wrought			
Dull	0.9	0.9	0.9
Lead			
Polished	0.35	0.05-0.2	n.r.
Rough	0.65	0.6	0.4
Oxidized	n.r.	0.3-0.7	0.2-0.6
Magnesium	0.3-0.8	0.05-0.3	n.r.
Mercury	n.r.	0.05-0.15	n.r.
Molybdenum			
Oxidized	0.5-0.9	0.4-0.9	0.2-0.6
Unoxidized	0.25-0.35	0.1-0.35	
Nickel			
Oxidized	0.8-0.9	0.4-0.7	0.2-0.5
Electrolytic	0.2-0.04	0.1-0.3	n.r.
Platinum			
Black	n.r.	0.95	0.9
Silver	n.r.	0.02	.n.r
Steel			
Cold-Rolled	0.8-0.9	0.8-0.9	0.7-0.9
ground Sheet	n.r.	n.r.	0.4-0.6
Polished Sheet	0.35	0.25	0.1
Molten	0.35	0.25-0.4	n.r.
Oxidized	0.8-0.9	0.8-0.9	0.7-0.9
Stainless	0.35	0.2-0.9	0.1-0.8
Tin(Unoxidized)	0.25	0.1-0.3	n.r.
Titanium			
Polished	0.5-0.75	0.3-0.5	n.r.
Oxidized	n.r.	0.6-0.8	0.5-0.6
Tungsten	n.r.	0.1-0.6	n.r.
Polished	0.35-0.4	0.1-0.3	n.r.
Zinc			
Oxidized	0.6	0.15	0.1
Polished	0.5	0.05	n.r.

n.r.=not recommended

To optimize surface temperature measurement accuracy:

1. Determine the object emissivity for the spectral range of the instrument to be used for the measurement.
2. Avoid reflections by shielding object from surrounding high temperature sources.
3. For higher temperature objects use shorter wavelength instruments, whenever possible.
4. For semi-transparent materials such as plastic film and glass, assure that the background is uniform and lower in temperature than the object.
5. Hold instrument perpendicular to surface whenever emissivity is less than 0.9. In all cases, do not exceed angles more than 30 degrees from incidence.
6. For 1M and 2M models, avoid measurements in high ambient light conditions.