Emissivity - Non-Metals

Emissivity Values for Common Materials

Emissivity is the measure of an object's ability to emit infrared energy. Emitted energy indicates the temperature of the object. Emissivity can have a value from 0 (shiny mirror) to 1.0 (blackbody). Most organic, painted, or oxidized surfaces have emissivity values close to 0.95. The majority of our IR sensors have an adjustable emissivity feature to ensure accuracy when measuring other materials, such as shiny metals.

Please note, these values are to be used as a guide only, as emissivity changes depending on the actual material surface and conditions.

Material	Emissivity Values			
	1.0 µm	5.0 µm	7.9 µm	8-14 µm
Asbestos	0.9	0.9	0.95	0.95
Asphalt	n.r.	0.9	0.95	0.95
Basalt	n.r.	0.7	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	0.7-0.9	0.7-0.8	0.7-0.8
Carborundum	n.r.	0.9	0.9	0.9
Ceramic	0.4	0.85-0.95	0.95	0.95
Clay	n.r.	0.85-0.95	0.95	0.95
Concrete	0.65	0.9	0.95	0.95
Cloth	n.r.	0.95	0.95	0.95
Glass				
Plate	n.r.	0.98	0.85	0.85
Gob	n.r.	0.9	n.r.	n.r.
Gravel	n.r.	0.95	0.95	0.95
Gypsum	n.r.	0.4-0.97	0.8-0.95	0.8-0.95
Ice	n.r.		0.98	0.98
Limestone	n.r.	0.4-0.98	0.98	0.98
Paint (non-Al.)		0.9-0.95	0.9-0.95	
Paper (any color)	n.r.	0.95	0.95	0.95
Plastic				
Opaque	n.r.	0.95	0.95	0.95
Over 20 mils	n.r.			
Rubber	n.r.	0.9	0.95	0.95
Sand	n.r.	0.9	0.9	0.9
Snow	n.r.		0.9	0.9
Soil	n.r.		0.9-0.98	0.9-0.98
Water	n.r.		0.93	0.93
Wood (natural)	n.r.	0.9-0.95	0.9-0.95	0.9-0.95

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.