

Table 1. Thermo-optic properties of some common materials (at 288 K).

Substance	Solar absorptance (normal) α	Emissivity (hemispherical, bolometric) ε
Alumina	0.1..0.25	0.3..0.5
Aluminium	0.1..0.15	0.05 ^a
Bakelite		0.94
Beryllium ^b	0.5..0.7	0.18
Brass		0.03..0.1
Copper	0.2..0.5	0.05
Cork		0.7
Elastomer		0.9
Glass (pyrex)		0.9
Glass (quartz)		0.93
Glass (window)	0.1	0.9
Ice	0.3..0.5	0.92
Iron (cast-)	0.3	0.2..0.7
Magnesium		0.2..0.5
Methacrylate		0.9
Nickel	0.2	0.05
Paper	0.3	0.95
Platinum		0.09
Polyethylenab		0.9
Polystyrenab		0.9
Polyurethanab		0.9
PVC ^a		0.9
Sand & soil	0.4..0.7	0.5..0.8
Silicon	0.7	0.3
Silver		0.02
Steel (carbon-)	0.2	0.2..0.6
Steel (stainless-)	0.4	0.2..0.3
Teflon (PTFE)	0.12	0.85
Titanium	0.4..0.7	0.2..0.5
Wolfram	0.45	0.09

- ^a) Aluminium emissivity may vary a lot, from 0.05 if polished, to 0.8 if hard anodised or dew-covered, or even $\varepsilon=0.85$ if black anodised. Solar absorptance also may vary from 0.09 if polished to 0.4 if hard anodised; aluminium foil gets hot under sunshine because $\alpha/\varepsilon=0.15/0.05>1$). Aluminium paint may have $\varepsilon=0.3$ when bright and $\varepsilon=0.6$ when dull.

Table 2. Thermo-optic properties of typical spacecraft surfaces (at 288 K).

Surface	BOL (Beginning of life)			EOL (End of life)		
	Solar absorptance, α	Emissivity, ϵ	α/ϵ	Solar absorptance, α	Emissivity, ϵ	α/ϵ
Aluminium anodised (structures)	0.20	0.60	0.33	0.80	0.80	1.00
Aluminium (vessels)	0.15	0.20	0.75	0.10	0.10	1.00
Aluminised kapton (al. inside)	0.40	0.80	0.50	0.40	0.80	0.50
Aluminised kapton (al. outside)	0.15	0.05	3.0	0.15	0.05	3.0
Beta cloth	0.30	0.85	0.35	0.40	0.85	0.47
Black paint (insides)	0.95	0.90	1.06	0.90	0.90	1.00
GFRP (solar panels, structures)	0.85	0.85	1.00	0.85	0.85	1.00
Goldised kapton (gold outside)	0.25	0.02	12	0.25	0.02	12
MLI (back aluminised kapton)	0.30	0.60	0.50	0.60	0.60	1.00
OSR (radiators)	0.08	0.80	0.10	0.08	0.80	0.10
Silver paint (electrically cond.)	0.35	0.45	0.78	0.50	0.60	0.83
Solar cells	0.70	0.70	1.00	0.80	0.80	1.00
Titanium tiodised (apogee motor)	0.60	0.60	1.00	0.60	0.60	1.00
White paint (antenna)	0.20	0.85	0.24	0.60	0.85	0.71