Appendix B

Properties of Sample Surfaces

This appendix contains the radiant properties of five sample surfaces, which have been described as follows:

1. **Surface A:** Magnesium, Alloy AZ 31, as received;
2. **Surface B:** Stainless Steel 301, Mil-S-5059, as received, cleaned;
3. **Surface C:** Glossy white paint(W. P. Fuller 517-W-1), TiO_2 pigment, silicone binder, applied about 1 mm thick on 2024 aluminum substrate;
4. **Surface D:**Aluminum Oxide (Rokide A) coating, flame-sprayed on 321 stainless steel substrate; and
5. **Surface E:** 1 Copper, anodized in sodium hydroxide for 30 minutes, mechanically polished.

The spectral reflectance of each is given in Table B.1 and plotted in Fig. B.1. The total emissivity of the various surfaces is plotted in Fig. B.2.

Table B.1: Reflectivity of some sample surfaces (adapted from Touloukian and DeWitt, *Themal Radiation Properties*, 1972). Wavelengths are in micrometers.

Surface A		Surface B		Surface C		Surface D		Surface E	
λ	ρ_λ	λ	ρ_λ	λ	ρ_λ	λ	ρ_λ	λ	ρ_λ
0.50	0.765	0.50	0.675	0.300	0.070	0.400	0.813	0.40	0.051
0.75	0.700	0.60	0.640	0.340	0.074	0.57	0.850	0.45	0.051
0.93	0.740	0.70	0.645	0.398	0.311	0.705	0.830	0.50	0.050
1.60	0.730	0.78	0.660	0.439	0.702	0.78	0.830	0.60	0.044
2.00	0.740	0.85	0.660	0.518	0.767	0.84	0.815	0.70	0.049
2.80	0.850	0.92	0.670	0.704	0.836	0.975	0.807	0.80	0.080
3.60	0.920	1.00	0.670	0.810	0.837	1.32	0.640	0.90	0.057
5.00	0.970	1.20	0.675	1.06	0.802	1.76	0.512	1.00	0.083
6.00	0.960	1.75	0.725	1.51	0.744	1.98	0.491	1.20	0.104
8.00	0.980	2.00	0.737	1.77	0.692	2.48	0.489	1.40	0.094
9.00	0.970	2.80	0.765	2.01	0.719	2.98	0.294	1.60	0.108
11.5	0.970	3.30	0.787	2.37	0.573	3.30	0.397	1.80	0.183
14.0	0.970	3.80	0.800	2.79	0.118	3.62	0.462	2.00	0.249
14.9	0.950	4.30	0.805	3.12	0.293	3.90	0.500	2.50	0.388
17.0	0.950	5.00	0.820	3.59	0.459	4.38	0.481	3.00	0.372
19.0	0.950	6.20	0.820	4.29	0.539	5.32	0.334	3.50	0.394
20.0	0.930	7.60	0.850	4.64	0.508	6.15	0.121	4.00	0.410
21.0	0.930	9.40	0.850	5.28	0.251	7.49	0.060	5.00	0.528
22.0	0.900	10.8	0.870	6.59	0.117	8.67	0.030	6.00	0.662
23.0	0.880	12.6	0.870	7.01	0.134	9.35	0.021	7.00	0.782
24.0	0.800	13.0	0.880	7.62	0.058	10.20	0.092	8.00	0.850
25.0	0.780	15.3	0.880	8.16	0.048	10.70	0.225	9.00	0.842
		16.9	0.900	8.47	0.094	11.50	0.273	10.0	0.818
		18.4	0.900	9.37	0.111	12.80	0.232	11.0	0.826
		20.0	0.880	10.5	0.072	16.35	0.236	12.0	0.828
		21.0	0.880	10.9	0.059	17.50	0.252	13.0	0.807
		21.2	0.880	13.1	0.075	20.8	0.231	14.0	0.734
		22.5	0.833	18.5	0.146	21.4	0.250	15.0	0.686
		23.7	0.755	23.2	0.172	22.0	0.223	16.0	0.825
		24.4	0.730	25.0	0.164	22.3	0.250	17.0	0.905
		25.0	0.720	28.8	0.189	22.8	0.222	18.0	0.938
				31.0	0.184	24.0	0.250	19.0	0.945
						25.0	0.250	20.0	0.975
								21.0	0.952

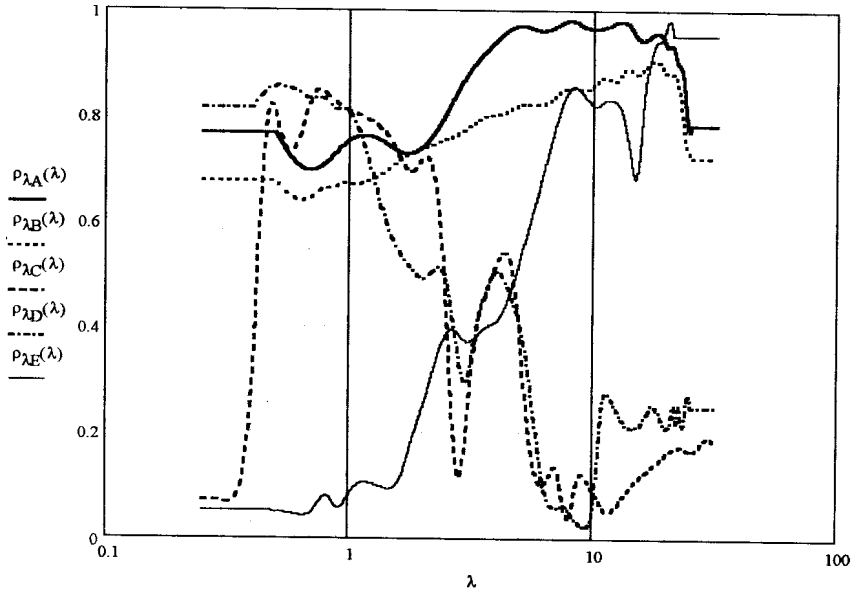

Figure B.1: Plot of the reflectivities of Surfaces A–E, as a function of wavelength. Wavelenghts are in μm.

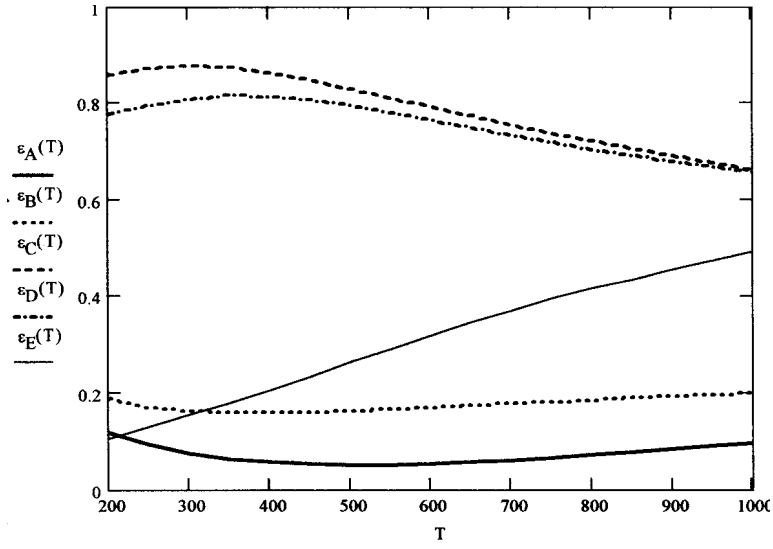

Figure B.2: Total emissivity as a function of temperature T (in K) for Surfaces A–E.