

REFLECTANCE OF A POLISHED ALUMINUM SURFACE

Spartan IR Camera for the SOAR Telescope

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We measured the reflectance of a highly polished aluminum blank. A similar polishing process will be used on a thermal reflector of the Spartan IR Camera. The reflectance is 95%.

The sample is 6061 aluminum polished with diamond lapping compound, the finest being grade 9, for which the particle size is 8-12 μ m. The appearance is that of a mirror.

Images of a hot resistor and its reflection off the sample were taken. The relative intensities of the resistor and its image were then compared to determine the reflectance of the sample.

The experimental apparatus consists of a 100-Ohm resistor suspended above an angled surface and connected to a 15 Volt power supply. The diamond-polished aluminum blank was hot-glued to the angled surface beneath the resistor. The distance from the top face of the blank to the resistor was approximately 12mm. The distance between the camera and resistor is 948 mm. This orientation allows the resistor as well as its reflected image to be photographed in a single picture.

The camera is an Amber Sentinel IR Camera, which is sensitive to 7-14 μ m.

Table 1 Data

| | <u>Picture</u> | <u>Object Int. (O)</u> | <u>Image Int. (I)</u> | <u>(I/O)</u> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------|-----------------------|--------------|
| The photometer feature in the Stargaze image reduction software package was used to measure the intensity of the images. This command removes the background and determines the intensity within an annulus of a user-defined radius. | 1 | 1.1693E+04 | 1.0848E+04 | 0.928 |
| | 2 | 1.1675E+04 | 1.0779E+04 | 0.923 |
| | 3 | 1.1243E+04 | 1.0338E+04 | 0.920 |
| | Average | | | 0.924 |

The average ratio of image intensity to object intensity for the polished face of the aluminum blank is 0.92 (Table 1). Corrected for the difference in path length, the reflectance is 95%.