

AN EXPERIMENTAL METHOD FOR MAKING SPECTRAL EMITTANCE AND SURFACE TEMPERATURE MEASUREMENTS OF OPAQUE SURFACES

Travis J. Moore, Matthew R. Jones, Dale R. Tree, R. Daniel Maynes and Larry L. Baxter
Brigham Young University
Provo, UT 84602 USA

ABSTRACT. An experimental procedure has been developed to make spectral emittance and temperature measurements. The spectral emittance of an object is calculated using measurements of the spectral emissive power and of the surface temperature of the object obtained using a Fourier transform infrared (FTIR) spectrometer. A calibration procedure is described in detail which accounts for the temperature dependence of the detector. The methods used to extract the spectral emissive power and surface temperature from measured infrared spectra were validated using a blackbody radiator at known temperatures. The average error in the measured spectral emittance was 2.1% and the average difference between the temperature inferred from the recorded spectra and the temperature indicated on the blackbody radiator was 1.2%. The method was used to measure the spectral emittance of oxidized copper at various temperatures.