Original Paper

Investigating Temperature Distribution of Two Different Types of Blackbody Sources Using Infrared Pyrometry Techniques

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Received: 14 July 2012  Accepted: 1 February 2013  Published online: 23 March 2013

Abstract
A comparison between two different types of thermal radiation sources maintaining near blackbody conditions has been carried out in the range from 50 to 500 °C. An infrared total radiation pyrometer was used as a transfer standard to measure the temperature of blackbodies. A thorough study of temperature distribution has been carried out for the large surface source in order to characterize the best location over the surface blackbody for temperature determination precisely of the order of better than 0.1 °C. The expanded uncertainty in the estimation of temperature of the radiating source in the above range of measurement was evaluated to be within ±0.24 °C at 50 °C and ±0.88 °C at 500 °C. The blackbody temperature sources found to be suitable for calibration of infrared total radiation pyrometers and thermal imaging devices in the operational range as mentioned above for laboratory use or other industrial and medical applications.

Keywords
Radiation pyrometer – Thermocouple – Blackbody source – Calibration – Emissivity