

Emissivity Measurements on Aeronautical Alloys

Leire del Campo^S, Luis González-Fernández and Raúl Benjamín Pérez-Sáez^C

Departamento de Física de la Materia Condensada, Universidad del País Vasco, Leioa, Bizkaia, Spain

Xabier Esquisabel and Ignacio Fernández

Industria de Turbo Propulsores, S.A., Planta de Zamudio, Zamudio, Bizkaia, Spain

Paloma González-Martín

Industria de Turbo Propulsores, S.A., Oficina Técnica Madrid, San Fernando de Henares, Madrid, Spain

Manuel J. Tello

Departamento de Física de la Materia Condensada, Universidad del País Vasco, Leioa, Bizkaia, Spain

The emissivity of three Ni and Co based aeronautical alloys is analyzed in this paper. These alloys are employed in high temperature environments whenever good corrosion resistance, high temperature resistance and high strength are essential. Thus, apart from the aeronautical industry, these alloys are also used in other technological applications, as for example, aerospace, nuclear reactors, and tooling. The results in this paper extend the emissivity data for these alloys available in the literature. Emissivity dependence on the radiation wavelength (2-22 μm), sample temperature (200-650 $^{\circ}\text{C}$) and emission angle (0° - 80°) has been investigated. In addition, the effect of surface finish and oxidation has also been taken into consideration. The total hemispherical emissivity can be calculated by integrating the spectral directional emissivity values. The data in this paper have several applications, as temperature measurement of a target by pyrometry, low observability of airplanes and thermal radiation heat transfer simulation in airplane nozzles or furnaces.