

## **Marine Corrosion Performance of Copper Alloy UNS C69100**

Mengyan Nie<sup>a</sup>, Julian A. Wharton<sup>a</sup> and John Zbilyj<sup>b</sup>

<sup>a</sup> National Centre for Advanced Tribology at Southampton (nCATS), Engineering Sciences, University of Southampton, Southampton, SO17 1BJ, UK.

<sup>b</sup> Tungum Limited, 200A Ashchurch Business Centre, Alexandra Way, Tewkesbury, GL20 8TD, UK

Correspondence e-mail: m.nie@soton.ac.uk

### **ABSTRACT**

Tungum alloy (UNS C69100) is an aluminium-nickel-silicon brass (chemical composition: 81-84% Cu, 0.70-1.20 Al, 0.8-1.40 Ni, 0.80-1.30 Si, with the remainder Zn) and is reported to have a good corrosion performance in marine environments (fully wetted, splash zone and atmospheric conditions). In order to gain an in-depth understanding of the marine corrosion performance of this alloy, electrochemical test methods including open-circuit potential, electrochemical impedance spectroscopy, potentiodynamic polarization, and zero-resistance ammetry were used for corrosion investigation of UNS C69100 in a 3.5 wt.% sodium chloride aqueous testing solution, in combination with optical microscopy and scanning electron microscopy. The corrosion properties of UNS C69100 obtained by electrochemical methods are also compared to six other alloys: UNS S31603, UNS S31254, UNS S32750, UNS N04400, UNS N08904 and UNS C36000. Galvanic coupling behaviour of UNS C69100 against these six alloys in a 3.5% NaCl solution for 30 days immersion are also reported in this paper.

**Keywords:** Tungum alloy, marine corrosion, galvanic corrosion, electrochemical impedance spectroscopy, zero-resistance ammetry, UNS C69100.