

Effect of heat treatment on the corrosion behaviour of LM6 in sulphuric acid and sodium hydroxide

ABSTRACT

Sulphuric acid (H_2SO_4) and sodium hydroxide (NaOH) are the main solutions used in water treatment stations to adjust the potential of hydrogen (PH). Pumps used in such stations must bear acidic and alkaline mediums. Pump parts such as impellers and casings could be made by aluminium silicon alloy (LM6) due to their cast-ability and corrosion resistance. In this paper, the corrosion behaviour of LM6 in acidic and alkaline solutions was investigated. The corrosion test samples of LM6 were prepared using a carbon dioxide sand casting mould. Test samples subjected to solution heat treatment. A corrosion test was conducted using the weight-loss method by immersing the samples in H_2SO_4 and NaOH. Resulted showed that the LM6 was more corroded in the alkali than in acid. Cumulative weight loss of non-heat-treated LM6 in H_2SO_4 was 11.23 mg/cm² while in NaOH was 177 mg/cm². Cumulative weight loss of heat-treated LM6 in H_2SO_4 was 8.44 mg/cm² while in NaOH was 192 mg/cm². The corrosion rate of non-heat-treated LM6 in H_2SO_4 was 78 MPY while heat-treated LM6 was 56 MPY. Concluded that LM6 is more corroded in NaOH than in H_2SO_4 and the heat-treated LM6 was more corrosion resistance than the non-heat-treated one.

Keyword: LM6; Sodium hydroxide; Sulphuric acid; Sand casting; Corrosion rate