

## **Effects of heat treatment on the hardness properties and microstructure of Al-6505 alloy**

### **ABSTRACT**

The effects of heat treatment on the ageing response, hardness properties and the microstructure development of Al-6505 alloy have been investigated. In order to study these effects, the alloy sample was solution treated at 550°C for 30 minutes and then quenched into cold water at room temperature followed by artificially aged at elevated temperature of 100 oC, 185 oC and 300 oC. The ageing response of Al-6505 alloy was monitored using Vickers hardness test. The distribution of the precipitates formed in Al-6505 alloy was monitored by transmission electron microscopy (TEM). The results showed that time to reach peak hardness and peak hardness values decreased as the ageing temperatures increased. It was found that increasing in hardness values of the alloy were due to needle-shaped precipitates formation during ageing treatment. Prolonged ageing time to over-aged condition resulting in increased the size but reduced the number of precipitates; as a result the hardness of Al-6505 alloy was reduced. The effects of heat treatment on the ageing response, hardness properties and the microstructure development of Al-6505 alloy have been investigated. In order to study these effects, the alloy sample was solution treated at 550°C for 30 minutes and then quenched into cold water at room temperature followed by artificially aged at elevated temperature of 100 oC, 185 oC and 300 oC. The ageing response of Al-6505 alloy was monitored using Vickers hardness test. The distribution of the precipitates formed in Al-6505 alloy was monitored by transmission electron microscopy (TEM). The results showed that time to reach peak hardness and peak hardness values decreased as the ageing temperatures increased. It was found that increasing in hardness values of the alloy were due to needle-shaped precipitates formation during ageing treatment. Prolonged ageing time to over-aged condition resulting in increased the size but reduced the number of precipitates; as a result the hardness of Al-6505 alloy was reduced.

**Keyword:** Al-6505 alloy; Heat treatment; Ageing response; Hardness; Microstructure