Characterization of Mechanical Properties Aluminum Alloy AA.319-T6 As a result of Holding Time Effect on Precipitation Hardening Process

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Abstract
Aluminum alloy AA. 319 has been used extensively in the automotive industry, especially for the body caliper and master cylinder, because it has high strength and ductility, and mechanical properties can be improved by the aging process (precipitation hardening). However, to obtain the best mechanical properties, aging resistance requires a calculation time (holding time) is appropriate. Aluminum alloy AA. 319 were subjected to solution treatment at a temperature of ± 495 °C with holding time 3 and 4 hours. As for artificial aging at a temperature of ± 175 °C with holding time 2, 4 and 6 hours. From the results of this study obtained data in the form of the mechanical properties of maximum tensile strength and hardness value with the variation of holding time 4 hours at temperatures of 495°C and the variation of holding time 6 hours at temperatures of 175°C with a tensile strength of Aluminium Alloys AA. 319-T6 335.09 MPa and hardness value 63.3 HRB. Analysis of the microstructure on AA.319-T6 aluminum alloy, identification at the testing phase XRD and SEM analysis showed the existence of Al-Si compounds are formed after the precipitation hardening process.

Keyword: Aluminium, Precipitation hardening, holding time, Mechanical properties