

# Study the factors affecting mechanical properties of A356 alloy LFCS for the illumination cover

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## ABSTRACT

Owing to possessing good electrical and thermal conductivity, light weight, well machinability, excellent ductility and corrosion resistance, lower cost, the aluminum alloys, replacing of steel and cast iron, are widely used in producing parts and assembly of vehicle. This study is focused on investigating the effect of EPC process parameters including coating, vacuum extraction and temperature of solid solution treatment on the mechanical properties of A356 alloy illumination cover EPC casting. The mechanical properties and microstructure observation were evaluated by Rockwell hardness tester, dynamic MTS, optical microscopy (OM) and scanning electron microscopy system (SEM+EDS). The result of this study reveals that the mechanical properties of A356 alloy EPC casting pattern coated with B type coating are higher than those coated with A type coating, and the properties are also improved to a great extent under the condition with a large vacuum extraction power of 30 hp. In addition, the mechanical properties are first increased and then decreased with the increase of temperature of solid solution treatment. The eutectic silicon is found to be spheroidized from the microstructure observation of OM. This phenomenon results in strengthening the A356 alloy EPC castings. According to the SEM observation, the Mg<sub>2</sub>Si phase having impediment effect of dislocation movement exists in the microstructure of castings with better mechanical properties. But if solid solution temperature was too high, the mechanical properties were reduced due to the reason of eutectic remelting zone in the EPC castings via OM and SEM analyses

Keywords : A356 aluminum alloy、EPC、vacuum extraction、coating、solid solution treatment、mechanical property

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