# The Effect of Pulse Current to the Micro Structure and Mechanical Properties on AZ80A Magnesium Alloy Welds


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**ABSTRACT**

According to the high development of technology, consumer demands for product are changed from function-oriented to fine quality and light-weight behavior. Also the "Green concept" is highly emphasized in the worldwide. The vehicle industries are selecting light weight materials to fabricate the vehicle to reduce the exhaust gases emission and increase the fuel efficiency. As we know, magnesium alloy exist many excellent characteristics; ex: low specific density, high specific strength and rigidity, good thermal conductivity, high damping capacity, and high electromagnetic interference, etc. Nevertheless, the HCP crystal structure causes the inferior results of formability and ductility. Therefore, not only improve the quality and properties of material but promote the manufacture processing techniques are important. One of the important techniques is the welding technology. In here, we select the most popular welding machine in manufacture industry, gas tungsten arc welding (GTAW), doing this welding research. Hopes that the influence on weld structure and mechanical properties by changing the frequency of alternating current (AC) and pulsing current could be understood, then obtain the welding characteristics and the best welding parameters of AZ80A magnesium alloy. Based on the experiment results shown that, the influence of AC frequency do not show clear affect to the weld property. However, by changing the frequency of pulsing current did obviously reveal the influence to the weld. With increasing the pulsing frequency, the grain refinement effect is very clearly, which will increase the mechanical properties (such as tensile strength, elongation, and toughness) gradually. Especially, at 9 Hz weld can obtain the finest grain size. Hopefully, the result of this study not only can accumulate the knowledge of magnesium welding, but also helps the traditional metal working industries to promote their welding skills and expand the applications of magnesium alloy.



Keywords : AZ80A Magnesium Alloy, Pulsing Current, Grain Refinement, Mechanical Properties


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