

Morphological, Mechanical and Tribological Properties Investigations of CMTed Parts of Al-5356 alloy

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Abstract : This paper investigates the impact of 3D printing parameters using the cold metal transfer (CMT) technique on the morphological, mechanical, and tribological properties of walls and massive parts made from aluminum alloy. The parameters studied include current intensity, torch movement speed, printing increment, and the flow rate of shielding gas. The manufactured parts, using the technique mentioned above, are walls and massive parts with different filling strategies, using grid and zigzag patterns and at different current intensities. The main goal of the article is to find out the welding parameters suitable for having parts with low defects and improved properties from the previously mentioned properties point of view. It has been observed from the results thus obtained that the high current intensity causes rapid solidification, resulting a high porosity and low hardness values. However, the high current intensity can cause very rapid solidification, which increases the melting point, and the part remains in the most stable shape. Furthermore, the results show that there is an evident relationship between hardness, coefficient of friction and wear test. Some interesting results are presented in this paper.

Keywords : aluminum alloy, porosity, microstructures, hardness

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