

## **Laser Micro-Welding of an Isomorphous System with Different Geometries: An Investigation on the Mechanical Properties and Microstructure of the Joint**

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**Abstract :** Due to the demand of miniaturizing in automotive industry, the application of laser welding is quite promising. The current study focused on laser micro-welding of CuSn6 bronze and nickel wire for a miniature electromechanical hybrid component. Due to the advantages of laser welding, the welding can be tailored specifically for the requirements of the part. Scanning electron and optical microscopy were implemented to study the microstructure and tensile-shear test was selected to represent the mechanical properties. Different welding sides, beam oscillations, and speeds have been investigated to optimize the tensile-shear load and microstructure. The results show that the mechanical properties and microstructure of the joint is highly under the influence of the mentioned parameters. Due to the lack of intermetallic compounds, the soundness of the joint is achievable by manipulating the geometry of the weld seam and minimize weld defects.

**Keywords :** bronze, laser micro-welding, microstructure, nickel, tensile shear test

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