

MATCHING LOAD IMPEDANCE FOR BEST POWER TRANSFER AT THE MICROWAVE WELDING OF COPPER WIRES

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ABSTRACT

This paper presents an analytical solution for the load matching impedance to the microwave generator for copper wires microwave welding process. The microwave heating principle (MW) is similar to the one that is specific to the commercial device consisting in the transformation of the alternant electromagnetic field into thermal energy by affecting the polar particles in the material. The main problem which appears at the heating process using microwave heating consists in the capacity of the materials to absorb the high frequency waves and to transform the electromagnetic energy in heat. This paper presents an analytical solution and a computer code for solving the problem of how to match the impedance of a dielectric material to the impedance of the transmission line using three stub tuners. Matching the impedance of a network to the impedance of a transmission line is firstly necessary, because it makes all the incident power to be delivered to the network and so, in case of heating to generate the most efficient heating process, and secondly it is necessary for a better behave of the generator, because, the generator is usually designed to work into an impedance close to the common transmission line. The main application of the matching load impedance system is the improving of the heating within the welding process of copper wires.

KEY WORDS: Copper wires welding, microwave welding, short stubs.

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