

Reliability of Dissimilar Metal Soldered Joint in Fabrication of Electromagnetic Interference Shielded Door Frame

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Abstract : Electromagnetic Interference (EMI) shielded doors made from brass extruded channels need to be welded with shielded enclosures to attain optimum shielding performance. Control of welding induced distortion is a problem in welding dissimilar metals like steel and brass. In this research, soldering of the steel-brass joint has been proposed to avoid weld distortion. The material used for brass channel is UNS C36000. The thickness of brass is defined by the manufacturing process, i.e. extrusion. The thickness of shielded enclosure material (ASTM A36) can be varied to produce joint between the dissimilar metals. Steel sections of different gauges are soldered using (91% tin, 9% zinc) solder to the brass, and strength of joint is measured by standard test procedures. It is observed that thin steel sheets produce a stronger bond with brass. The steel sections further require to be welded with shielded enclosure steel sheets through TIG welding process. Stresses and deformation in the vicinity of soldered portion is calculated through FE simulation. Crack formation in soldered area is also studied through experimental work. It has been found that in thin sheets deformation produced due to applied force is localized and has no effect on soldered joint area whereas in thick sheets profound cracks have been observed in soldered joint. The shielding effectiveness of EMI shielded door is compromised due to these cracks. The shielding effectiveness of the specimens is tested and results are compared.

Keywords : dissimilar metal, EMI shielding, joint strength, soldering

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