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Arc characteristics and metal transfer behavior of CMT+P welding process

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ABSTRACT: The cold metal transfer (CMT) with addition of pulses (CMT+P) process is a new CMT welding method. The CMT+P transfer mode is a combination of a projected transfer mode with one droplet per pulse and a short circuit transfer mode during the cold metal transfer period. The results indicate that the current and voltage waveforms of the CMT+P welding process were quite different from those of the traditional CMT process. The appearance of the high initial arcing current and the current pulse steps as well as the low current for the pulse time phase for the first CMT period indicate a stable, smooth CMT+P transfer process. The high pulse current of the CMT+P process results in a higher heat input compared to the CMT process. A greater penetration and contact angle of the weld bead can be obtained by increasing the pulse number.

Keywords: Cold metal transfer; Metal transfer behavior; Arc characteristics.

1. Introduction

The cold metal transfer (CMT) is invented by company Fronius. Schierl (2005) reported that CMT is a new technique developed on the basis of MIG / MAG welding process. The CMT welding process achieves a stable, spatter-free droplet transfer process via precise control of current parameters at all welding stages and wire movement during the short-circuit transfer mode. Feng et al. (2009) previously reported that aluminum alloy sheets are ideal for welding due to their low heat input, high deposition