# Accepted Manuscript


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PII: S0924-0136(18)30293-0
DOI: https://doi.org/10.1016/j.jmatprotec.2018.07.003
Reference: PROTEC 15830

To appear in: *Journal of Materials Processing Technology*

Received date: 26-2-2018
Revised date: 2-7-2018
Accepted date: 2-7-2018

Please cite this article as: Zhao Y, Shi X, Yan K, Wang G, Jia Z, He Y, Effect of shielding gas on the metal transfer and weld morphology in pulsed current MAG welding of carbon steel, *Journal of Materials Processing Tech.* (2018), https://doi.org/10.1016/j.jmatprotec.2018.07.003

# Effect of shielding gas on the metal transfer and weld morphology in pulsed current MAG welding of carbon steel

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## Abstract:

A high-speed camera system has been used to observe the metal transfer with bead-on-plate welding. A stable pulsed streaming spray transfer was accompanied by arc jumping when the shielding gas of Ar+4%$CO_2$+3%$O_2$ was used, but the change of metal transfer mode had a tight relationship with the bell-shaped arc rather than critical current when a mixture of Ar+13%$CO_2$+3%$O_2$ was as shielding gas. With increasing $CO_2$ concentration in the shielding gas, the bright arc area and arc length decreased due to the compression effect of carbon dioxide. Weld penetration and weld width increased slightly due to the higher arc force. The ferrite content in the weld metal increased slightly with increasing $CO_2$ concentration in the shielding gas.

## Key Words:

Metal transfer; Pulsed current MAG welding; Shielding gas; Weld morphology;