Shielding Gas Comparison for Spray and Short Circuit Transfer Modes

Jarrod Bichon, Matt Schrift, Josh Holtsberry, and Jeff Hixon, The Ohio State University

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The many advantages of Gas Metal Arc Welding (GMAW) make it one of the most common metal joining processes in today's industry, including its low cost and ease of automation. Gases of different chemistries can be selected as shielding to target weld geometries and modes of metal transfer. Knowledge of these gases and how their chemistries affect the weld is important to the welding engineer. Welding parameters also have a large impact on the shape of a weld and transfer mode. Gas suppliers are especially interested in knowing and demonstrating the effects of their standard and proprietary gas mixtures, and being able to recommend optimum welding parameter ranges.

This project has the objective of documenting the effects of five different proprietary shielding gas combinations on GMA fillet welds for the sponsor. Penetration and bead geometry characteristics will be compared using metallography for each shielding gas with two primary modes of metal transfer, spray and short circuit transfer. Modes of metal transfer will be identified using high-speed video analysis and compared between gases. The results will provide in depth technical information that could be used to train personnel and to market each gas's performance to potential customers.