

C617884 : MAJOR METALLURGICAL ENGINEERING

KEY WORD:

TIG PULSE PARAMETERS / WELD BEAD FORMATION / 304L AUSTENITIC
STAINLESS STEEL

PRASONG CHAUMBRI : EFFECTS OF TIG PULSE PARAMETERS AND SHIELDING GAS
COMPOSITIONS ON WELD BEAD FORMATION AND MICROSTRUCTURE OF THE 304L
AUSTENITIC STAINLESS STEEL AT VARIOUS WELDING POSITIONS. THESIS
ADVISOR : GOBBOON LOTHONGKUM, Dr.-Ing. 93pp. ISBN 974-636-363-8.

The effects of TIG pulse parameters such as welding speed, pulse current, base current, pulse frequency and % on time were investigated for welding of the 304L austenitic stainless steel sheet, 3 mm thickness, in flat, vertical and overhead positions, to keep the weld bead profiles in accordance with DIN 8563 quality class AS. The shielding gas used was pure argon and a mixture of argon with 1, 2 and 3% (v/v) nitrogen. The results showed that at the welding speed of 3.4 mm/sec, the pulse frequency of 1 pulse/sec and 55% on time can be used for all welding positions by adjusting the pulse and base current suitably to keep the bead contours in accordance with DIN 8563 quality class AS. The results indicated that W/D were between 2.7 - 2.8. The liquid metal in the weld pool ran down by gravitation force and an undercut occurred in both the longitudinal edges of the weld bead. There was a limitation to control the bead contours and penetration bead, to correspond to the requirements of DIN 8563 quality class AS. The nitrogen in the argon shielding gas affects the delta ferrite in weld metal's microstructure. Nitrogen mixed in argon shielding gas at 3% (v/v) reduced the delta ferrite in the weld metal's microstructure to 12% (v/v).

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