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# Effects of welding speed on absorption rate in partial and full penetration welding of stainless steel with high brightness and high power laser

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## ABSTRACT

The objectives of this paper are to measure the absorption rate based on water calorimetric method for both full and partial penetration welding and to evaluate the energy loss by spatter and metallic plume in 6 kW laser welding of 304 austenitic stainless steel according to the X-ray observed keyhole characteristic and loss of specimen weight. In partial penetration welds of 9 mm thickness, the absorption rate decreased from 73% to 62% with the welding speed from 50 to 150 mm/s due to the decrease in multiple reflections of laser beam inside the keyhole. In full penetration welds of 3 mm thickness, the absorption rate increased from 42% to 61% with the welding speed owing to the decrease in the amount of beam escaped from the keyhole inlet on the bottom surface of the sheet. At 50 mm/s in full penetration welds, fluctuation in

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