

Effect of Preheat and Annealing on the Arc Welding of Cast Iron*

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Abstract

Effects of preheat and annealing on the structures and the properties of deposited metal, and the white iron layer in the heat-affected zone of cast iron welds were investigated with the single bead method by using commercial mild steel and Ni 55 electrode.

Bead-cracks by mild steel electrode were markedly decreased at preheat temperatures higher than 400°C. Microstructures also varied at this temperature, namely bainite was observed in the heat-affected zone, and the deposited metal was changed from martensite to white iron. With increasing preheat temperature, penetration of deposited metal was increased, consequently carbon content of the deposited metal was increased. Bead-cracks were decreased with decreasing welding currents.

When preheat temperature was low, the hardness of weldment was increased by 300°C annealing in both cases of mild steel and Ni 55 electrode, because of the increase of retained austenite and the precipitations of carbide.

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