

The Influence of C Element on the Phase Transformation in Weldment of Complex Stainless Steels 2507/316/316L

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Abstract : Super duplex stainless steel has excellent mechanical properties and corrosion resistance. It becomes important structural material as its application has been extended to the fields such as renewable energy and the chemical industry because of its excellent properties. As examples are offshore wind power, solar cell machinery, and pipes in the chemical industry. The mechanical properties and corrosion resistance of super duplex stainless steel can be eliminated by welding due to the precipitation of the hard and brittle σ phase, which is rich of chromium, and molybdenum elements. This paper studies the influence of carbon element on the phase transformation of δ -ferrite and σ phase in 2507 super duplex stainless steel. The 2507 will be under argon gas protection welded with 316 and 316L extra low carbon stainless steel separately. The microstructural phases of stainless steels before and after welding, in fusion, heat affected zones, and base material will be studied via X-ray, OM, SEM, EPMA i.e. their quantity, size, distribution, and morphology. The influences of diffusion by carbon element will be compared according to the microstructures, hardness, and corrosion tests.

Keywords : complex stainless steel, welding, phase formation, carbon element, sigma phase, delta ferrite

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