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Flash butt Weldability of Inconel718 Alloy

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ABSTRACT

Following fast upsetting deformation, the welding seam (WS) is formed at the surface of flash butt welded Inconel718 joint due to dynamic recrystallisation. The dissolution of γ'' and γ' phases during temporary flashing is mainly responsible for the ~30% hardness decrease in the heat-affected zone (HAZ). A wider zone with lowered hardness indicates a broader HAZ created with a gentler temperature gradient. The increased temperature in the whole HAZ leads to more serious formation of carbides and liquation at the grain boundaries. Such unsuitable microstructure accounts for a 50-70% loss of ductility, while only ~10% of ductility is lost in another welding joint with suitable temperature gradient.

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