

Production of Thick Walled Castings in Duplex Stainless Steels Using Equilibrium Phase Calculations

SUSANA MARTINEZ DE LA PUENTE

Allard Europe, Tunrhout, Belgium

ABSTRACT

Casting duplex stainless steels with heavy sections is delicate. The risk of fracture during processing has to be minimized, and the right phase balance has to be achieved in the end product.

The production route consists basically of two steps; first the material is cast and allowed to solidify in the mold, and subsequently it is annealed and quenched.

The purpose of this final anneal is to dissolve all the unwanted as-cast phases and obtain the 50% ferrite-50%austenite microstructure typical of duplex stainless steels. Equilibrium phase calculations are essential to choose the optimal annealing parameters that will accomplish this, for a given composition.

They are also a valuable tool to predict whether a certain composition will result in an acceptable microstructure or not. Finally, provided that the precipitation of unwanted phases is avoided during the quench, equilibrium phase calculations are quite reliable to predict the end phase balance.