

# Ageing Behavior and Restoration by Heat Treatments of 2205 Duplex Stainless Steel

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**Abstract :** Duplex stainless steels (DSS) are prone to intermetallic phase formation at high temperatures, which can drastically decrease the toughness property. This work investigates the microstructural evolution of  $\sigma$  phase in a SAF 2205 DSS after subsequent isothermal aging and annealing treatments and there influences on mechanical properties. We submit specimens to impact testing and hardness measurements before and after ageing and restore treatments. The results showed that considerable changes in term of precipitation of intermetallic particles were observed in microstructure. The formation of these intermetallic phases such as  $\sigma$  was recognized as the major reason for the observed changes. However aging at 850°C led to a significant decrease in toughness and slight increase in hardness and the high temperature treatment at 1080°C dissolves all secondary phases..

**Keywords :** duplex stainless steel, ageing, Restore, Toughness, sigma Phase