

# Flow Behavior and Microstructural Evolution of 316 Stainless Steel under Hot Compression

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## Abstract

Hot deformation characteristics of 316 stainless steel were investigated at elevated temperatures. Hot compressive tests were carried out in the temperature and strain rate ranges from 900 to 1100 °C and  $1 \times 10^1$  to  $1 \text{ s}^{-1}$ , respectively. Correlation between the flow behavior and the microstructural evolution was analyzed. The flow behavior showed that the softening mechanisms were related to the dynamic recovery (DRV), dynamic recrystallization (DRX), and grain growth. Flow behavior analyses and microstructural observations indicated that DRV was the major softening mechanism at high strain rates and low temperatures. Dynamic softening proceeded via a combination of DRV and DRX at intermediate strain rates and temperatures. The contribution of DRV to the softening effect decreased with decreasing strain rate (or increasing temperature). Grain growth was the major softening effect at low strain rates and high temperatures.

Keyword : 316 Stainless steel, Flow behavior, Dynamic recovery, Dynamic recrystallization.