Improved and simplified dislocation density based plasticity model for AISI 316L

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Highlights

- A flow stress of the stainless steel AISI 316L, covering temperatures up to 1300°C and strain rates from 0.01 to 10 s^{-1}, has been calibrated and validated. It has been made more consistent with underlying physical assumptions than in previous published work.
- It is assumed that dislocation motion is the dominating mechanism contributing to plastic flow and the model requires evolution equations for the density of immobile dislocations.
- The flow stress is the sum of long-range and short-range contributions.
- Published data for Hall-Petch and solution hardening contributions have been made temperature dependent and included in the flow stress model.