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**Efficient temperature dependence of parameters for thermo-mechanical finite element modeling of alloy 230.** (English) [Zbl 1478.74023](#)

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Summary: Nickel-based alloys are often selected for manufacturing components operating in extreme conditions such as high-temperature thermo-mechanical cyclic loadings because of their good corrosion and high temperature resistance. This is, for instance, the case for solar receivers where the material undergoes daily cycles going from ambient temperature to approximately 700 C. To predict the material behavior under this type of complex loadings, advanced numerical models – such as Chaboche-type models – are required. In addition to the model, a complete representation of the temperature dependency of the material is essential for both numerical stability and physical accuracy of the model, which is obtained with parameters assuring a certain continuity over the studied range of temperature. To this end, a new formulation for the temperature dependency of material parameters in Chaboche-type models is proposed for the Alloy 230 under both anisothermal and isothermal cyclic loadings.

**MSC:**

[74F05](#) Thermal effects in solid mechanics

[74C10](#) Small-strain, rate-dependent theories of plasticity (including theories of viscoplasticity)

[74R99](#) Fracture and damage

[74S05](#) Finite element methods applied to problems in solid mechanics

**Keywords:**

temperature-dependent cyclic viscoplasticity; Chaboche model; thermo-mechanical fatigue

**Full Text:** [DOI](#)

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