

Load Relaxation Behavior of Ferritic Stainless Steels

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Abstract : High-temperature deformation behavior of ferritic stainless steels such as STS 409L, STS 430J1L, and STS 429EM has been investigated in this study. Specimens with fully annealed microstructure were obtained by heat treatment. A series of load relaxation tests has been conducted on these samples at temperatures ranging from 200 to 900oC to construct flow curves in the strain rate range from 10^{-6} s⁻¹ to 10^{-3} s⁻¹. Strain hardening was not observed at high temperatures above 800oC in any stainless steels. Load relaxation behavior at the temperature was closely related with high-temperature mechanical properties such as the thermal fatigue and tensile behaviors. Load drop ratio of 436L stainless steel was much higher than that of the other steels. With increasing temperature, strength and load drop ratio of ferritic stainless steels showed entirely different trends.

Keywords : ferritic stainless steel, high temperature deformation, load relaxation, microstructure, strain rate sensitivity

Conference Title : ICMSEM 2016 : International Conference on Materials Science, Engineering and Manufacturing

Conference Location : Singapore, Singapore

Conference Dates : March 03-04, 2016