High Temperature Hold Time Effects on Fine Grain Processed 718 Fatigue Properties

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Abstract

Fine Grain Alloy 718 is a relatively cost effective turbine and compressor disk alloy with superior yield strength and low cycle fatigue properties. An understanding of Alloy 718's response to environmental and temperature conditions under sustained peak or dwell conditions is a requirement for assessing actual in-service capability. This is especially critical when the disk operating conditions exceed historical engine experience with Alloy 718. This paper presents a detailed review of experimental dwell low cycle fatigue and cyclic crack growth results for fine grain alloy 718. The experimental fatigue results combined with the observed physical initiation and propagation mechanisms were used to develop a comprehensive life prediction system for fine grain Alloy 718 turbine disk.