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## Pulsed Film Cooling on a Turbine Blade Leading Edge

By James L. Rutledge

Biblioscholar Okt 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x17 mm. This item is printed on demand - Print on Demand Neuware - Unsteadiness in gas turbine film cooling jets may arise due to inherent unsteadiness of the flow through an engine or may be induced as a means of flow control. The traditional technique used to evaluate the performance of a steady film cooling scheme is demonstrated to be insufficient for use with unsteady film cooling and is modified to account for the cross coupling of the time dependent adiabatic effectiveness and heat transfer coefficient. The addition of a single term to the traditional steady form of the net heat flux reduction equation with time averaged quantities accounts for the unsteady effects. An experimental technique to account for the influence of the new term was devised and used to measure the influence of a pulsating jet on the net heat flux in the leading edge region of a turbine blade. High spatial resolution data was acquired in the near-hole region using infrared thermography coupled with experimental techniques that allowed application of the appropriate thermal boundary conditions immediately adjacent to the film cooling hole. The turbine blade leading edge was simulated...



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