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## Thermal Load Considerations for Detonative Combustion-Based Gas Turbine Engines

By Daniel E. Paxson

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 22 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. An analysis was conducted to assess methods for, and performance implications of, cooling the passages (tubes) of a pulse detonation-based combustor conceptually installed in the core of a gas turbine engine typical of regional aircraft. Temperature-limited material stress criteria were developed from common-sense engineering practice, and available material properties. Validated, one-dimensional, numerical simulations were then used to explore a variety of cooling methods and establish whether or not they met the established criteria. Simulation output data from successful schemes were averaged and used in a cycle-deck engine simulation in order to assess the impact of the cooling method on overall performance. Results were compared to both a baseline engine equipped with a constant-pressure combustor and to one equipped with an idealized detonative combustor. Major findings indicate that thermal loads in these devices are large, but potentially manageable. However, the impact on performance can be substantial. Nearly one half of the ideally possible specific fuel consumption (SFC) reduction is lost due to cooling of the tubes. Details of the analysis are described, limitations are presented, and implications are discussed. This item ships...


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