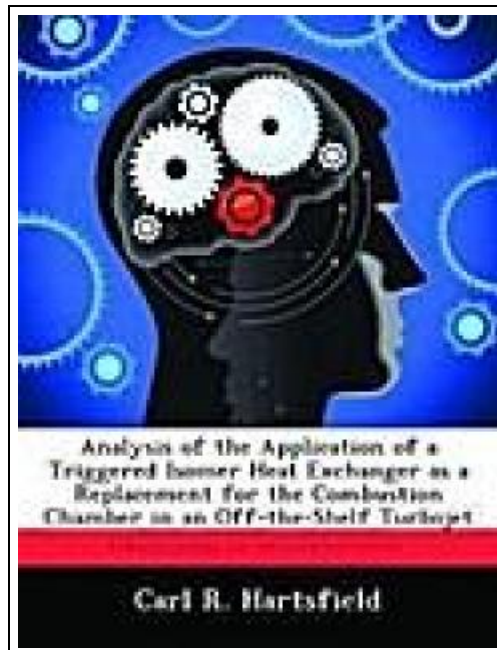


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(Dr. Cullen Schmitt MD)

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Biblioscholar Okt 2012, 2012. Taschenbuch. Book Condition: Neu. 246x189x6 mm. This item is printed on demand - Print on Demand Neuware - The objective of this research was to determine the feasibility of using a nuclear reaction heat source, such as the electromagnetically triggered decay of an isomer, in a solid-state heat exchanger to power an off-the-shelf gas turbine engine. Two primary performance measures examined were the total pressure decrement across the heat exchanger and the total temperature capability leaving the heat exchanger. The analysis included the use of a commercial software package, ANSYS// 5.6.1, running on a 700 MHz Pentium III PC. This package includes the FLOTRAN computational fluid dynamics program, a finite element program based on unstructured meshes, with multiple discretization schemes, turbulence models, and advection options. Boundary conditions on velocity, pressure, temperature, heat flux, and heat generation are available and were used in this research. Three basic geometries of heat exchanger were explored in this research: Concentric annular tubes, radial trapezoidal fins, and a dual, concentric annulus of rectangular fins. These were selected due to the simplicity of geometry and potential ease of manufacture. In addition, because the flow through all of these geometries could be reasonably approximated by a series of two dimensional flow fields, run times were on the order of 1 day, a significant reduction from 3-D flow calculations. All three configurations produced sufficient heat transfer. Pressure ratios across the heat exchangers varied in the range from 94.5970 to 97.5%. Turbine inlet temperatures varied from 986 K to 1150 K (1775 R to 2070 R). In the J-57 engine, these conditions will produce a static, sea-level thrust of approximately 37,000 N (8,300 lb.) to 47,000 N (10,600 lb.), compared to 46,000 N (10,300 lb.) for the conventional engine. 94 pp. Englisch.



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