



# Effects of Thermal Barrier Coatings on Approaches to Turbine Blade Cooling

By Robert J. Boyle

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 26 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. Reliance on Thermal Barrier Coatings (TBC) to reduce the amount of air used for turbine vane cooling is beneficial both from the standpoint of reduced NO<sub>x</sub> production, and as a means of improving cycle efficiency through improved component efficiency. It is shown that reducing vane cooling from 10 to 5 percent of mainstream air can lead to NO<sub>x</sub> reductions of nearly 25 percent while maintaining the same rotor inlet temperature. An analysis is given which shows that, when a TBC is relied upon in the vane thermal design process, significantly less coolant is required using internal cooling alone compared to film cooling. This is especially true for small turbines where internal cooling without film cooling permits the surface boundary layer to remain laminar over a significant fraction of the vane surface. This item ships from La Vergne, TN. Paperback.



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