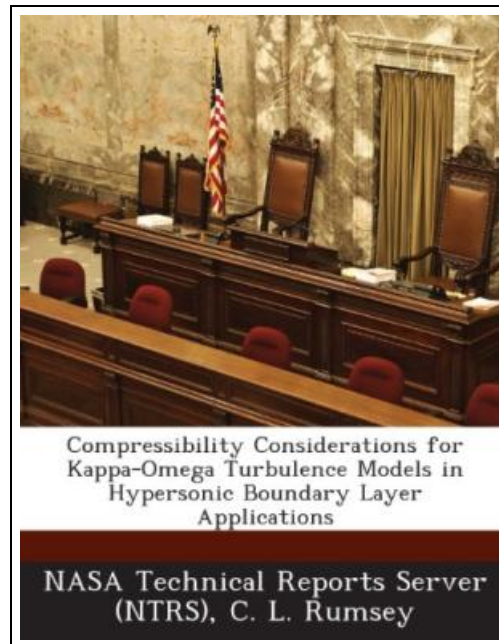


## Compressibility Considerations for Kappa-Omega Turbulence Models in Hypersonic Boundary Layer Applications



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## COMPRESSIBILITY CONSIDERATIONS FOR KAPPA-OMEGA TURBULENCE MODELS IN HYPERSONIC BOUNDARY LAYER APPLICATIONS



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Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book \*\*\*\*\* Print on Demand \*\*\*\*\*.The ability of kappa-omega models to predict compressible turbulent skin friction in hypersonic boundary layers is investigated. Although uncorrected two-equation models can agree well with correlations for hot-wall cases, they tend to perform progressively worse - particularly for cold walls - as the Mach number is increased in the hypersonic regime. Simple algebraic models such as Baldwin-Lomax perform better compared to experiments and correlations in these circumstances. Many of the compressibility corrections described in the literature are summarized here. These include corrections that have only a small influence for kappa-omega models, or that apply only in specific circumstances. The most widely-used general corrections were designed for use with jet or mixing-layer free shear flows. A less well-known dilatation-dissipation correction intended for boundary layer flows is also tested, and is shown to agree reasonably well with the Baldwin-Lomax model at cold-wall conditions. It exhibits a less dramatic influence than the free shear type of correction. There is clearly a need for improved understanding and better overall physical modeling for turbulence models applied to hypersonic boundary layer flows.



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