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OVERVIEW OF THERMAL BARRIER COATINGS IN DIESEL ENGINES

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An understanding of delamination mechanisms in thermal barrier coatings has been developed for diesel applications through nondestructive evaluation, structural analysis modeling and engine evaluation of various thermal barrier coatings. This knowledge has resulted in improved thermal barrier coatings which survive abusive cyclic fatigue tests in high output diesel engines. Significant efforts are still required to improve the plasma spray processing capability and the economics for complex geometry diesel engine components.

Data obtained from advanced diesel engines on the effect of thermal barrier coatings on engine fuel economy and emissions has not been encouraging. Although the underlying metal component temperatures have been reduced through the use of the thermal barrier coating, engine efficiency and emission trends have not been promising.

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