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TBC EXPERIENCE IN LAND BASED GAS TURBINES

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This paper summarizes prior and on-going machine evaluations of TBC coatings for power generation applications. Rainbow testing of various TBCs on turbine nozzles, shrouds and buckets are described along with one test on combustor liners. GEPG has conducted over 15 machine tests with TBC coated turbine nozzles of various coatings. Rainbow test times generally range between 10,000 to 24,000 hours. TBC performance has been quite good and additional testing, including TBC's on shrouds and buckets, is continuing. The results show that TBCs have the capability of surviving in power generation machines for the times required. The earlier rainbow tests which evaluated various top coat compositions resulted in confirmation of the superiority of YSZ and especially the 6-8 YSZ composition. On-going tests are more focused on TBC process and property variations. The prevalent failure modes seen thusfar in the various rainbow tests are erosion, foreign object damage and buildup of deposits. Additional post test analysis is required to investigate bond coat oxidation and other time/temperature dependent changes to the system.

Included is a brief comparison of TBC requirements for power generation and aircraft turbines.

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