PERFORMANCE ANALYSIS OF A GAS TURBINE PLANT WITH COATED BLADES

Ion V. ION [a], Jorge MARTINS [b], Krisztina UZUNEANU [a], Anibal PORTINHA [b]

[a] University "Dunărea de Jos" of Galati, ROMANIA, 47 Domneascã St., tel. +40236414871, fax +40236461353

[b] Universidade do Minho, PORTUGAL, Campus de Azurém, 4800 Guimarães, tel +351253510220,

e-mail: ion.ion@ugal.ro, jmartins@dem.uminho.pt

ABSTRACT

Nowadays with the purposes of further increase the efficiency of gas turbines plants a higher gas turbine inlet temperature is required. This makes the use of new materials essential. Super alloy developments (with directional and single crystal solidification) allow its operation above 1000ºC under higher stresses. The highly thermal loaded, parts of gas turbines are usually protected with a MCrAlY (M-Ni, Co) bond coat, coating which provides oxidation protection and better thermo-mechanical compatibility with a ceramic thermal barrier coating (TBC). Thermal barrier coatings allow higher inlet temperatures for the same cooling rates or even reducing and simplifying the cooling systems. In order to show the effect of thermal barrier coatings application on turbine blades, numerical models were developed that calculate the gain in thermal efficiency, net power and the pollutant emissions of the turbine plants.

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