

Abstract

Abstract This paper describes an experimental study for a 30:1 scaled model reproducing an innovative wedge shaped discharge trailing edge (TE) cooling scheme. Three configurations were investigated: Smooth, Ribs + 60° and Ribs + 60° with both closed and open tip. Thermochromic Liquid Cristal TLC technique was used to measure the heat transfer coefficient, for a Reynolds number between 10,000 and 40,000 in the stationary condition. The results reveal a direct effect of the Reynolds number and the configurations of cooling scheme on the heat transfer coefficient. Cooling efficiency is influenced by the ribs, the tip configuration and the flow regime. The average Nusselt number at the inlet duct region L0 and the exit trailing edge L1 region is correlated firstly based only on the Reynolds number and secondly on the Reynolds number, Prandtl number and a fraction of blade height. The derived correlations may serve in assessing the effectiveness of blades TE cooling systems