MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Poster Session (P)

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STUDIES ON AERO THERMODYNAMICS PERFORMANCE IN THE GAP BETWEEN THE BASE SIDE AND THE BASEBOARD OF AIR RUDDERS IN ARC WIND TUNNEL

Abstract

The experimental studies on aerodynamics performance in the gap between the base side and the baseboard of air rudders were conducted in arc wind tunnel. The height of the gap was between 3mm and 5mm and the defection angle of the rudder was 0. In the experiments, some parameters such as the cold wall heat fluxes, the static pressures on the baseboard and the rudderpost in the gap were measured. The results showed that the gas in the gap was severely compressed; The cold wall heat fluxes and the static pressures on the baseboard were incessantly increased along the fluid field and amounted to the largest value at the rudderpost. Meanwhile, the ratios of the cold wall heat fluxes on the axis and those on the leading edge at the same horizontal position were found with the different total enthalpies. In the end, based on the N-S equation, the above-mentioned experimental conditions were calculated, which obtained agreement with the experimental results.