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Experimental Analysis of Impinging Single and Twin Circular Synthetic Jets GENNARO CARDONE, CARLO SALVATORE GRECO, GIUSY CASTRILLO, TOMMASO ASTARITA, Department of Industrial Engineering, University of Naples Federico II, Naples, Italy, EXPERIMENTAL THERMO-FLUID-DYNAMICS RESEARCH TEAM — The behavior of impinging single synthetic jet and twin circular synthetic jets in phase opposition is experimentally investigated by using Particle Image Velocimetry (PIV) at Reynolds and Strouhal numbers equal to 5100 and 0.024, respectively. Different inter-axes distances for the twin configuration and several nozzle-to-plate distances have been investigated. The time-averaged behavior of the all velocity components are reported and discussed. Their distributions, near the impinging plate, are described for both the synthetic jet configurations and for all the nozzle-to-plate distances. At low nozzle-to-plate distance (H/D <4) the axial velocity profile near the impinging plate shows a double peak with a minimum on the jet axis. Instead, at high nozzle-to-plate distance (H/D >6), the axial velocity profile is bell-shaped. This is ascribed to the adverse pressure gradient strength and the potential core-like region extension. Indeed, the turbulence distribution shows a region characterized by low values, resembling the potential core region of continuous jets. Comparing the two synthetic jet configurations, a higher centerline velocity and a smaller jet width have been found for the twin case.

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