

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Flow field features of impinging jets with fractal grids

GIOACCHINO CAFIERO, Università degli Studi di Napoli “Federico II”, STEFANO DISCETTI, Aerospace Engineering Group, Universidad Carlos III de Madrid, TOMMASO ASTARITA, Università degli Studi di Napoli “Federico II” — An experimental investigation of the flow field features of impinging jets equipped with a fractal turbulence promoter at short nozzle to plate distances is carried out by means of 2D-3C Particle Image Velocimetry (Stereo-PIV). The test Reynolds number based on the nozzle diameter is set to 10,000. Both the instantaneous and the time averaged features of such flow field are discussed. The comparison with the well-known features of a circular jet without any turbulator (JWT) reveals how some of the peculiar features of this flow field are suppressed by the presence of the grid. The typical ring-vortex that arises as a consequence of the shear layer instability is perturbed and suppressed by the high frequency disturbance introduced by the grid. As a consequence, there is no vortex separation in correspondence of the impinging plate, then leading to the absence of the characteristic “double peak” in the Nusselt number profile for JWT.

Gioacchino Cafiero
Università degli Studi di Napoli “Federico II”

Date submitted: 01 Aug 2014

Electronic form version 1.4