

Abstract Submitted
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Wake dynamics and hydrodynamic forces on a perforated circular plate in cross-flow¹ FRANCISCO HUERA-HUARTE², Universitat Rovira i Virgili — The cross-flow past a perforated plate is known to become steady, if certain critical porosity or number of holes is imposed to the plate. This happens because the air bleed in the near wake, disrupts the vortex street formation behind the plate, and leads to suppression of the near wake shear layer interaction, forcing the instabilities to take place further away from the disk. This phenomenon is accompanied by a drag reduction. It is not clear however, what is the effect of the porosity distribution used in the plate, neither the effect of the angle of attack on the wake dynamics and the force coefficients. The experimental apparatus consists of an acrylic model in which different number and configuration of holes can be used. The disk hangs upside down from a 2-axis balance, in a way that it is being exposed to a uniform water current generated in a free surface channel. Angles of attack, porosity and its distribution on the disk, can be easily changed. Measurements of force coefficients for different angles of attack, and porosities have been taken. Digital Particle Image Velocimetry (DPIV) has been used to quantify the wake and to investigate the flow structures past the disk.

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