Drag and near wake characteristics of flat plates normal to the flow with fractal edge geometries JOVAN NEDIC, Imperial College London, BHARATH GANAPATHISUBRAMANI, University of Southampton, CHRISTOS VASSILICOS, Imperial College London — Past results have suggested that the coefficient of drag and shedding frequencies of regular polygon plates all fall within a very narrow band of values. In this study, we introduce a variety of length-scales into the perimeter of a square plate and study the effects this has on the wake characteristics and overall drag. The perimeter of the plate can be made as long as allowed by practical constraints with as many length-scales as desired under these constraints without changing the area of the plate. A total of eight fractal-perimeter plates were developed, split into two families of different fractal dimension all of which had the same frontal area. It is found that by increasing the number of fractal iterations, thus the perimeter, the drag coefficient increases by up to 10%. For the family of fractal plates with the higher dimension, it is also found that when the perimeter increases above a certain threshold the drag coefficient drops back again. Furthermore, the shedding frequency remains the same but the intensity of the shedding decreases with increasing fractal dimension. The size of the wake also decreases with increasing fractal dimension and has some dependence on iteration without changing the area of the plate.

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