

# Effect of structure height on the drag reduction performance using rotating disk apparatus

Musaab K Rashed<sup>1,2</sup>, Hayder A Abdulbari<sup>3</sup>,  
Mohamad Amran Mohd Salleh<sup>1,4</sup> and M Halim Shah Ismail<sup>1</sup>

<sup>1</sup> Department of Chemical and Environmental Engineering, Faculty of Engineering, University Putra Malaysia, Malaysia

<sup>2</sup> Institute of Technology, Middle Technical University, Foundation of Technical Education, Iraq

<sup>3</sup> Center of Excellence for Advanced Research in Fluid Flow, Universiti Malaysia Pahang, Malaysia

<sup>4</sup> Material Processing Technology Laboratory, Institute of Advanced Technology, Universiti Putra Malaysia, Malaysia

E-mail: [hayder.bari@gmail.com](mailto:hayder.bari@gmail.com)

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## Abstract

The drag reduction characteristics in a rotating disk apparatus were investigated by using structured disks with different riblet types and dimensions. Two disk types were fabricated with right angle triangular (RAT) grooves and space v-shape (SV) grooves, with six dimensions for each type. A high-accuracy rotating disk apparatus was fabricated and then used to investigate the turbulent drag reduction characterization of the disk in diesel fuel. In this work, the effects of several parameters are investigated; riblet types, riblet dimensions, and rotational disk speed (rpm) on the drag reduction performance. It was found that the surface structure of the disk reduced the drag, this was clearly seen from the comparison of torque values of smooth and structured disks. Drag reduction for structured disks was higher than that for smooth disks, and SV-grooves showed better drag reduction performance than RAT-grooves. In addition, it was observed that the drag reduction performance increased with decreasing groove height for both groove types. The maximum drag reduction achieved in this study was 37.368% for SV-groove at 1000 rpm, compared with 30% for RAT-groove, at the same rotational speed.