

## **Active drag reduction in hydrocarbon media using rotating disk apparatus**

### **ABSTRACT**

A high precision rotating disk apparatus (RDA) is designed and employed to investigate the turbulent drag reduction characterization induced by polymeric additives. For the past few decades, polymers have been used widely as drag reducer agents in a pipeline and RDA successfully due to its viscoelastic properties that can suppress the turbulent at high ranges of Reynolds number. In this study, drag reduction efficacy of diesel fuel in a rotating disk apparatus is investigated using high molecular weight polyisobutylene polymer as drag reducing agent. Dependence of drag reduction on different parameters such as: polymer concentration and rotational disk speed (RPM) are also investigated. In addition, the mechanical stability of this polymer with time was studied by measuring torque values for 300 sec at a fixed rotational speed (2000 rpm). It was observed that the drag reduction of diesel fuel increases with the rotational disk speed and polymer concentration till a critical concentration at which the maximum drag reduction achieved. The maximum DR obtained was about 19.197% at  $Re = 902062$  and PIB concentration of 150 ppm.

**Keyword:** Drag reduction; Polyisobutylene; Rotating disk apparatus; Diesel fuel