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Influence of Flow on Longevity of Superhydrophobic Coatings MOHAMED A. SAMAHA, HOOMAN VAHEDI TAFRESHI, MOHAMED GAD-EL-HAK, Department of Mechanical & Nuclear Engineering, Virginia Commonwealth University, Richmond, VA 23284 — Previous studies have demonstrated the capability of superhydrophobic surfaces to produce slip flow and drag reduction, which properties hold considerable promise for a broad range of applications. However, in order to implement such surfaces for practical utilizations, environmental factors such as water movement over the surface must be observed and understood. In this work, experiments were carried out to present a proof-of-concept study on the impact of flow on longevity of polystyrene fibrous coatings. The time-dependent hydrophobicity of a submerged coating in a pressure vessel was determined while exposing the coating to a rudimentary wall-jet flow. Rheological studies were also performed to determine the effect of the flow on drag reduction. The results show that the longevity of the surface deteriorates by increasing the flowrate. The flow appears to enhance the dissolution of air into water, which leads to a loss of drag-reduction.

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