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Measurements of drag and flow over biofilm JOEL HARTENBERGER, JAMES W. GOSE, MARC PERLIN, STEVEN L. CECCIO, University of Michigan–Ann Arbor — Microbial 'slime' biofilms detrimentally affect the performance of every day systems from medical devices to large ocean-going vessels. In flow applications, the presence of biofilm typically results in a drag increase and may alter the turbulence in the adjacent boundary layer. Recent studies emphasize the severity of the drag penalty associated with soft biofouling and suggest potential mechanisms underlying the increase; yet, fundamental questions remain—such as the role played by compliance and the contribution of form drag to the overall resistance experienced by a fouled system. Experiments conducted on live biofilm and 3D printed rigid replicas in the Skin-Friction Flow Facility at the University of Michigan seek to examine these factors. The hydrodynamic performance of the biofilms grown on test panels was evaluated through pressure drop measurements as well as conventional and microscale PIV. High-resolution, 3D rigid replicas of select cases were generated via additive manufacturing using surface profiles obtained from a laser scanning system. Drag and flow measurements will be presented along with details of the growth process and the surface profile characterization method.

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