

Flow and Efficiency Measurement for Ionic Air Moving Devices, and a Call to Collaboration

Michael Sean June
Department of Engineering & Technology
Western Carolina University
Cullowhee, NC 28723
e-mail: msjune@email.wcu.edu

Abstract— In multidisciplinary research, an often encountered challenge is identifying the “other” disciplines to engage. Electrostatic centered research can involve metrology, thermodynamics, heat transfer, fluid dynamics, classical mechanical engineering, physics, materials, as well as circuits and of course, electrical engineering. Measuring the flow and efficiency of an air moving device of any kind falls under the discipline of fluid dynamics and thermodynamics. Therefore, a reasonable way to measure the flow characteristics, including efficiency of an ionic (electrohydrodynamic) air moving device would be as a more conventional air moving device would be measured. The added benefit to this approach is a better comparison between the types of air moving devices. Conventional air moving devices are evaluated for both airflow, pressure and efficiency using a device called a flow bench. The result is a curve showing airflow as a function of static pressure. Overlaid on this graph can be static efficiency, or total efficiency, but most commonly static efficiency. The capability for this type of measurement is more often seen in industry than in academia. In order to make a valid comparison with conventional air moving devices, this capability must be sought or developed and make part of ionic air moving device research.