

Evaluating Clean Bench Designs Using CFD and Particle Tracing

A. Johnson¹, M. Wright¹

¹Honeywell FM&T, Kansas City, MO, USA

Abstract

At the Kansas City National Security Campus (KCNSC), simulation analysts are often called upon to evaluate designs and manufacturing processes performed in the plant. Precision mechanisms need to be assembled on clean benches that provide laminar airflow to prevent dust contamination. Mechanism engineers modified the layout of the bench to include computer monitors to improve the efficiency and ergonomics for operators using the bench, but were concerned that the extra items could potentially cause problems by obstructing the laminar airflow. We utilized the CFD and Particle Tracing modules in COMSOL to analyze the airflow around these new obstructions, and explored how varying particle sizes would behave. This study provided an envelope of locations in which items can be safely placed without impacting the flow through critical areas. Also, having provided the ability to visualize airflow, these models are used to train supervisors and operators on clean bench best practices.

The Kansas City National Security Campus is operated by Honeywell Federal Manufacturing & Technologies, LLC for the United States Department of Energy under Contract No. DE-NA0002839