

Performance of air cleaners for VOC and particle removal and measurement of single pass efficiency for in-duct air cleaners

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The goals of this project was to test the selected portable (room) and duct mounted (whole house) residential scale air cleaning devices for their effectiveness in removing VOC and particulate contaminants. Different off-the-shelf residential air cleaners were selected, covering major air cleaning technologies. A “pull-down” test procedure was developed for the simultaneous measurement of particle and VOC removal efficiency in a full-scale chamber. The results implicate that adsorption and UV-PCO are two major effective ways to control indoor VOCs. Besides, the single pass efficiency of in-duct particle filter was tested with two methods: direct-upstream-downstream measurement (η_d) and pull-down measurement (η_{CADR} per CADR measurement). The results show that the $\eta_{CADR} < \eta_d$, especially for large particles. The relationship between the two measured efficiency were determined.

Reference:

Chen W., Gao Z., Zhang J., 2006, Reduced Energy Use through Reduced Indoor Contamination in Residential Buildings, Final Report NCEMBT 061101.

Jingjing Pei, Wenhao Chen, Zhi Gao and Jianshun Zhang, Simultaneous Measurement of Single pass Efficiency and Clean Air Delivery Rate for In-duct Air Cleaners – Test Method, Results and Implications, submitted to Indoor Air 2008.

