Air Cleaner Testing and Development

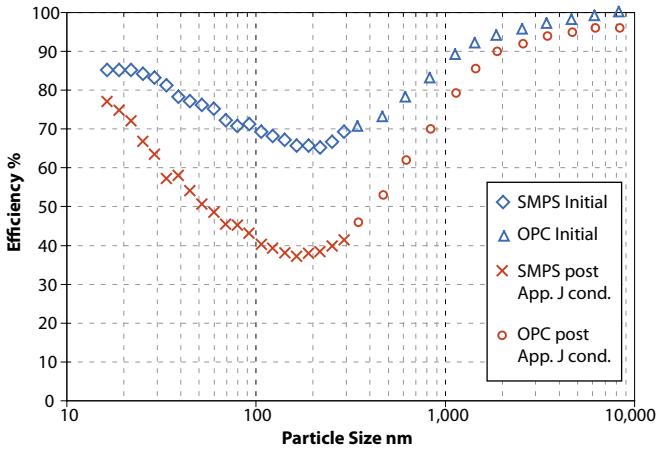
Through combined expertise in aerosol filtration, gas adsorption, and microbiology, RTI International offers unmatched capabilities and professional experience in air cleaner testing, evaluating the efficiency of air cleaning equipment for the removal of particles, gases, and bioaerosols.

RTI's extensive facilities combine modern test ducts with state-of-the-art aerosol, gas, and microbiological generation and measurement equipment. Program personnel are actively engaged with the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), the U.S. Environmental Protection Agency (EPA), ASTM International, the U.S. Department of Defense, and commercially sponsored projects and committee activities.

Case Study in ASHRAE Testing of Particle and Gas-Phase Filters

Client Problem: Reliable third party was needed to test data to support advertising claims and meet building specifications. The filters in question include charged and uncharged media filters and a carbon-based sorbent filter.

RTI Solution: Our technical experts recommended ASHRAE 52.2 as the standard filter test to give the customer the often needed MERV rating. Appendix J conditioning is recommended for the charged filters to give the MERV-A now needed to show a likely *in situ* minimum performance. For the carbon filter, ASHRAE 145.2 with toluene as the challenge was suggested. Testing was performed and satisfied the customer's testing needs.



Filter Before and After Appendix J Sub-micron KCl Conditioning

Strengths

- Confidential testing and test results
- Quick turnaround
- Testing of ventilation filters, adsorber air cleaners, biocide-treated media, HEPA filters, paint overspray arrestors, UV lights, PCO units, and swatches or flat-sheet media samples
- Independent, third-party evaluation
- Test method development and validation
- ASHRAE, IES, ASTM, EPA, and customized test methods

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Tests and Challenges

RTI offers a full range of air cleaner testing services and numerous air cleaner challenges that can be run at various concentrations, air flow rates, and efficiencies. Our experienced professional and technical staff can also work with customers to design specific testing as needed for their products.

Particle Removal

- ASHRAE 52.2: Method of Testing General Ventilation Air-cleaning Devices for Removal Efficiency by Particle Size
- EPA Method 319: Fractional Efficiency Determination of Paint Overspray Arrestors
- Customized particle testing procedures, including nanoparticles
- Solid-phase salts, powders, and dusts; liquid-phase oils; monodisperse and polydisperse size distributions; particle diameters from 0.01–10 µm

Case Study in Filtration Research

Client Problem: Determinations were needed on an in-development air cleaner expected to protect against particles, bioaerosols, and gases without making dangerous byproducts.

RTI Solution: RTI's team of aerosol engineers, microbiologists, and chemists recommended tests per ASHRAE 52.2–based initial efficiency; optional sub-0.3 µm particle efficiency; bioaerosol tests with a virus, a bacteria, and a fungus; and a gas-phase test with acetaldehyde and ozone. Client chose to run the initial efficiency test and a gas-phase test with ethanol as the challenge.

Promising results led to improvements in the air cleaner, which was then returned to RTI for the bioaerosol test and an in-depth VOC challenge test with byproduct analysis. Client improved their product and has data to back up performance claims.

Gas Removal

- ASHRAE 145.2: Laboratory Test Method for Assessing the Performance of Gas-Phase Air Cleaning Systems: Air Cleaning Devices
- Customized testing consistent with current EPA, ASHRAE, and SAE standards development efforts
- VOCs, ozone, SO_2

Bioaerosol Removal

- Customized removal efficiency and biocidal efficacy testing following EPA, ASTM, and RTI protocols
- Fungi, including *Penicillium*, *Aspergillus*, and *Cladosporium*. Bacteria, including *Staphylococcus*, *Bacillus*, and *Pseudomonas*

Other

- Customized particle/gas/bioaerosol removal efficiency testing from below 1–3,000 CFM on media samples up to full-size air cleaning devices

More Information

M. Kathleen Owen
Program Manager
919.541.6941

Jean Kim
Research Microbiologist
919.541.8087
jeankim@rti.org

RTI International
3040 E. Cornwallis Road, PO Box 12194
Research Triangle Park, NC 27709-2194 USA

RTI 7551 R3 1115