



Reading for the
R&D Community

Published by

 Reed Business Information.



How to Do 
June 2002

How to Ensure Reduced Flow Fume Hood Performance

Reduced Flow Fume Hood: A laboratory fume hood that operates with significantly lower exhaust flows (up to 50%) compared to conventional fume hoods.

A fast-growing trend in laboratory fume hood design has been the introduction of reduced flow fume hoods by a number of fume hood manufacturers. These reduced flow hoods operate with substantially reduced exhaust volumes and can provide the fume hood owner with significant initial capital construction cost savings, as well as continuous operating cost savings. While these reduced flow hoods offer potentially enormous savings, it is vital that the owner not lose sight of the fume hood's principle purpose—user safety. It is imperative that the fume hood owner ensures that the fume hoods they purchase can perform effectively.

Fume hood performance is determined by numerous factors, including hood design and heating, ventilation, and air-conditioning (HVAC) system design. Face velocity is not as important a factor as the hood's ability to contain contaminants generated within the chamber. Reduced flow hoods do not violate any major national standard governing fume hoods, providing they can be shown to effectively perform their function. Many organizations, including the Occupational Safety and Health Administration (OSHA) and the American Industrial Hygiene Association (AIHA), have moved away from specific fume hood face velocity requirements or recommendations in favor of performance requirements.

One of the few organizations that requires a specific operating face velocity, California-OSHA, has recently issued a variance allowing the use of reduced flow hoods on a project in that state. Cal-OSHA is currently revising their standard to include parameters that allow the use of reduced flow hoods, providing they meet certain performance criteria.

One of the single most effective methods for testing the performance of laboratory fume hoods is to follow the ASHRAE 110 method of testing performance of laboratory fume hoods, from the American National Standards Institute (ANSI) and the American Society of Heating, Refrigerating, and Air Conditioning Engineers Inc. (ASHRAE). The ASHRAE standard utilizes a tracer gas test to measure hood leakage at a simulated hood user's "breathing zone." The ASHRAE standard helps users quantify and compare fume hood performance, as well as evaluate the relative safety that the hood provides. The standard can also show inherent flaws in fume hood, HVAC system, and/or room designs that velocity measurement testing alone cannot. The AIHA recommends that specification and procurement of fume hoods be based upon the hood's performance in the ASHRAE test.

Use of a reduced flow hood does not mean that safety is compromised. Test data show that properly designed reduced flow hoods can outperform conventional fume hoods operating with twice the exhaust flow.

Safety conscious owners have been organizing de-tailed and stringent fume hood performance evaluations prior to the purchase of their reduced flow fume hoods. Due to the fact that many of these reduced flow hoods are new to the market, the fume hood owner should investigate the following prior to purchasing reduced flow hoods from each manufacturer under consideration:

- Number of projects on which the reduced flow hood has been used. Included with this information should be the quantity of hoods on each project and a reference for each project.
- Availability of various size reduced flow hoods and the hood's operating sash height. Some manufacturers have a limited size offering for their reduced flow hood line and others market reduced flow hoods with severely restricted sash openings.
- ASHRAE 110 fume hood performance data, both "as manufactured" (factory test) and "as installed" (field data) for the reduced flow hood. It is more desirable to have the test data from an independent testing agency.

Have the manufacturer provide as much performance data as possible. Modified ASHRAE tests with increased tracer gas release rates, dynamic challenges (including walk-by tests and sash movement), and lower mannequin "breathing zone" locations all provide additional challenges to the hood's ability to perform.

If your project budget allows, consider purchasing one reduced flow hood from each manufacturer you are considering and hiring an independent testing firm to conduct a comparative performance analysis at your site on each manufacturer's reduced flow fume hood. This will provide you with hard data and an expert opinion on which reduced flow hood will operate most effectively in your lab environment. It will also allow your user group to "kick the tires" and voice their opinion on which hood provides the best ergonomics and ease of use.

Reduced flow hoods are definitely the wave of the future in fume hood design. The recent explosion of reduced flow fume hoods on the market has shown that hood manufacturers are working night and day to develop the safest and most energy efficient products they can.

—Bob DeLuca, Jr.

DeLuca is VP of technical products at Lab Crafters Inc.

Web Resources for Fume Hoods

www.lab-crafters.com
www.ashrae.org
www.aiha.org