

# FACE VELOCITY - FUME HOOD SAFETY

By Dale T. Hitchings, PE, CIH  
SAFELAB Corporation  
Indianapolis, Indiana  
Phone: 317-872-6600  
Fax: 317-872-6640  
e-mail: dhitchings@safelab.com

Most Industrial Hygienists and Laboratory Safety Officers still use average face velocity determined by a simple fume traverse of the sash opening as an indicator of fume hood safety. But this is changing. For about ten years now, many fume hood experts have stated that face velocity may not be an accurate indicator of hood safety. And thanks to the development and publication of ASHRAE/ANSI Standard 110 *Method of Testing Performance of Laboratory Fume Hoods* evidence is now available to prove that face velocity and fume hood safety have little statistical correlation.

Obviously, the goal of fume hood testing is to determine how well the hood protects the laboratory worker from the hazardous substances released inside of it. The only way to test this empirically is to do personal air sampling. Unfortunately, this method is impractical due to the time and expense of testing all workers for all compounds. The next best method is the ASHRAE/ANSI 110 method which is relatively inexpensive to perform and can determine quantitatively and repeatably how well fume hoods contain a tracer gas released in the hood. This method, first published in 1985 and extensively revised in 1995 uses flow visualization (smoke testing), face velocity testing, and tracer gas containment testing to evaluate hood performance. A recent statistical analysis of more than 160 fume hoods tested by the author reveals a correlation of only 15% between tracer gas containment levels and face velocity. Data from sub populations of identical hoods in identical positions in identical labs show correlations only as high as 26%.

Based on information like this and other anecdotal evidence, several large chemical and pharmaceutical companies have now adopted the ASHRAE/ANSI 110 method to evaluate hood performance. They can then determine the face

velocity at which an individual hood has satisfactory containment and *only then* use that velocity as a indicator of performance for periodic hood testing.