EDITOR'S PAGE

A workshop on laboratory chemical hoods in biomedical facilities (A Critical Review of What We Know and Need to Know) was held recently at the Howard Hughes Medical Institute and the findings of the several expert panels will become generally available soon.

It is difficult to think of a laboratory operating without this primary safety device but laboratory procedures have changed in the biomedical field and continue to change at a rapid rate in response to new technical developments, new methods, and new instruments. As I visit new laboratories, that include teaching facilities, I am struck by the reduction in the number of traditional chemical fume hoods I observe. I am inclined to think that a reduced need for chemical fume hoods has been an important factor in the rapid adoption of open-type laboratories that concentrate common-use facilities in one area. Even when small numbers of chemical fume hoods have been provided, I observe that they continue to be used for storing bottles of volatile chemicals.

The reasons for a reduction in the use of chemical fume hoods in laboratories devoted to the biomedical sciences are:

- Advances in analytical technologies have made it possible to work easily with micro- and nanoquantities. In fact the most widely used instruments cannot accept larger samples.
- Development of totally enclosed automatic instruments that confine operations and limit emissions.
- Severe limits on the amount of chemicals that can be kept in the laboratory.
- The high energy costs associated with operating chemical fume hoods, as well as the high purchase cost and complexity associated with VAV systems, make it necessary to justify explicitly the purchase and installation of every chemical fume hood.

In spite of the decrease in the use of chemical fume hoods in biomedical laboratories, they are certain to persist as a primary engineered safety device in such laboratories. Some of the most important workshop findings relate to the significance of the widely-used hood containment test known as ASHRAE 110. The test protocol calls for the release of a Freon inside the hood at a fixed rate (4L/min) as a contaminant simulant and measurement of hood leakage (in ppm) at the center and edges of the hood work opening. A life-sized manikin is placed in front of the hood to simulate an operator and leakage measurements are made in the normal breathing zone of the manikin.

The hood containment test is conducted in a draft-free room in the absence of work activity and human circulation—an admittedly ideal situation. In addition, the manikin lacks movements and heat emissions of a living, breathing human operator that also affect hood containment properties. In spite of these deviations from normal laboratory operation, the standard test makes it possible to compare the containment properties of various laboratory fume hoods and to select only models that demonstrate good aerodynamic design and careful construction. This is extremely desirable and highly useful. Nevertheless, the results of standard chemical fume hood tests need to be viewed with extreme caution when assessing the risk associated with performing specific experimental operations with identified toxic and infectious materials in a designated chemical fume hood for the following reasons:

- The absence of normal work activity inside the hood, a warm operator's body, disturbing ventilation drafts and traffic past the hood characterize the results of the standard tests as "ideal," in contrast to "real."
- Unlike the standard tests universally used to certify models of biological safety cabinets, there are no safety-related acceptance criteria built into the chemical fume hood test protocol, making the results of even well-performing chemical fume hoods equivocal with regard to practical safety considerations.
- The currently-used standard chemical fume containment tests were designed for comparing vertical sash-operated by-pass hoods, they do not function well with auxiliary air or with hoods equipped with horizontal sliding sash, especially when they are installed in VAV-ventilated
laboratories.
We should conclude from this that:
• When using chemical fume hoods safety requires careful observance of good operating technique (as well as a well-operating hood) just as when one uses a certified biological safety cabinet.
• There is an expectation that the conclusions and recommendations that will come out of the recent chemical fume hood workshop will be effective in resolving the serious issues currently associated with assessing the safety risks associated with the use of chemical fume hoods.

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