

Importance of Airflow Monitors for Fumehoods

by Gary Holland

Laboratory safety encompasses many diverse aspects. From an HVAC standpoint, the most common is the fumehood. Laboratories of all types utilize fumehoods as a means of protecting their employees or students and the processes and experiments that are performed. How can the person responsible for safety in the laboratory be sure that employees are being protected—all the time—from potentially hazardous fumes?

For many years, the inclusion of an airflow alarm, or monitor (see *Figure 1*), has been recommended. Most specifications addressing an alarm on a hood referred to one or more regulatory guidelines that suggested that a monitoring device be included with the fumehood, at least on new and remodeled hoods. The most commonly referenced guidelines were from such diverse organizations and publications as:

- National Research Council—*Prudent Practices For Handling Hazardous Chemicals In Laboratories*, 1981
- NFPA—*Fire Protection For Laboratories Using Chemicals*, 1981
- Public Works, Canada—*Standards & Guidelines*, 1988
- OSHA Lab Standard—*Occupational Exposure To Hazardous Chemicals In Laboratories*, 1991
- ASHRAE—*Applications Handbook*, 1991
- ANSI—*Laboratory Ventilation Standard*, 1992
- SEFA—*Laboratory Fume Hoods Recommended Practices*, 1992.



Figure 1 Airflow monitor.

Of particular relevance are the dates of the above documents—all were published 12 or more years ago, with the exception of two that were published over 20 years ago. In the 1980s and early 1990s, the use of a fumehood as a primary safety device was still being refined. The same can also be said for the airflow monitor as an important safety accessory. The majority of the regulatory guidelines utilized language that recommended an airflow alarm, which was mandatory only in the case of a new or remodeled (i.e., moved to another location) fumehood.

While this was certainly a step forward in laboratory safety from a ventilation standpoint, good laboratory practices continued to evolve throughout the 1990s. Since then, many of these documents have been revised with stronger language regarding the need for an airflow monitor. *Table 1* compares the original wording to the revised wording.

As regulations have been revised, qualifying conditions have been eliminated:

- No longer just new or remodeled hoods, but all hoods, with no exceptions
- No longer when an alarm is furnished, but all hoods, with no exceptions
- No longer a string or ribbon, but a real monitoring device that can indicate proper hood operation.

The wording of each regulatory guideline that changed in recent years now applies simply to “all hoods.” These changes were made to improve laboratory fumehood safety. Conscientious safety officers, industrial hygiene professionals, and laboratory supervisors would agree with the industry experts on the committees of the above organizations that providing the safest working environment possible for all laboratory occupants is of utmost importance. A monitor on each fumehood is the logical conclusion.

Table 1 Document revisions on laboratory safety guidelines

Regulation	Original wording*	Current wording
NFPA 45	1981: Airflow indicators <i>shall</i> be installed on <i>new</i> laboratory hoods or on <i>existing</i> laboratory hoods, <i>when modified</i> .	2000: A measuring device for hood airflow <i>shall</i> be provided on <i>each</i> laboratory hood.
ANSI Z9.5	1992: <i>New and remodeled</i> hoods <i>shall</i> be equipped with a flow measuring device.	2003: <i>All hoods shall</i> be equipped with a flow indicator, flow alarm, or face velocity alarm indicator to alerts users to improper exhaust flow.
SEFA	1992: <i>When furnished</i> , a monitoring device <i>shall</i> , by a visible or audible signal, or both, give warning when the airflow through the hood has fallen below a predetermined level.	2002: <i>All hoods shall</i> have some type of monitor for indicating face velocity or exhaust flow verification. A ribbon taped to the bottom of the sash is not acceptable.
ASHRAE	1991: It is <i>good practice</i> to equip laboratory fumehoods with alarm devices to detect failure of exhaust airflow.	2003: Updated to now include a reference to NFPA 45.
OSHA Lab Standard (29 CFR 1910.1450)	1991: Each hood <i>should</i> have a continuous monitoring device to allow convenient confirmation of adequate hood performance before use.	Has not changed since original publication.

*Emphasis added.

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