



# Environmental Health & Safety



## RADIATION PROCEDURES MANUAL Procedure Cover Sheet

Procedure Title: Fume Hoods

Procedure Number: EHS-08-03-REV 2

Effective Date: 18 September, 2018

Approved By   
Director Environmental Health  
and Safety

Date: 18 Sept 18



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## A. INTRODUCTION

1. Inhalation of toxic chemical vapors or radioactive materials must be prevented by performing all operations that release gases, vapors or dusts in fume hoods or glove boxes when practical.
  - a. Fume hoods draw contaminants away from lab personnel and prevent their escape into laboratory areas and glove boxes isolate the contaminants from the work environment
2. Idaho State University recommends that the average fume hood face velocity be maintained at 90 to 120 feet per minute (100 fpm -10%, +20%).
  - a. Hoods designed to work at other face velocities are to be to have a face velocity benchmark determination, and visual method (smoke) or tracer gas study (covered in section D of this procedure).
  - b. Face velocity can be lost due to vent obstructions, duct punctures, exhaust motor failures, and other system problems.
3. If the desired hood velocity cannot be maintained, the user must make arrangements for repairs or modifications.
4. Hood face velocities are to be checked bi-annually during regular laboratory evaluations performed by the Environmental Health and Safety Department, lab managers are encouraged to routinely verify that their fume hoods are in proper working order.
  - a. To provide full protection, the hood must be free of major obstructions to the flow of air.
  - b. All lab doors should be closed to ensure maximum negative pressure within the room, and foot traffic near the hood should be avoided.
  - c. The sash, or glass panel, of the fume hood serves as a shield to protect the face from splatters and excess gas or particle inhalation; it also controls the air flow of the hood system.

- d. The sash should be not be raised above the sash stop (approximately 14 inches) while work is in progress, and it should be kept closed when not in use to conserve energy.

## **B. PURPOSE**

The purpose of this procedure is to describe the steps involved in testing fume hood face velocity to ensure that capture and containment of toxic chemical vapors or radioactive materials within the hood is attained under working conditions.

## **C. REQUIRED MATERIAL(S)**

Velometer, that is within calibration period.

Visual method (smoke) test materials

## **D. PROCEDURE**

Fume hood face velocities are tested using a velometer. The procedure for fume hood inspection is as follows:

1. Ensure that the hood monitor's normal operation green light is lit (if applicable).
2. Test the battery on the velometer
3. Record the serial number and calibration date of the velometer.
4. Raise the fume hood sash about a foot to initiate air flow. Most fume hoods at ISU run continuously; however some models may need to be turned on.
5. Follow the manufacturers operating procedures for the velometer in use for this testing.
6. Place the velometer within the airflow between the sash and the work-area rim. The arrow on the top of the probe must be turned to match the direction of the air flow.
7. Record fpm readings from at least 5 locations within the air flow (note: some velometer are equipped to measure multiple locations simultaneously).
8. In general hoods are assigned 100 cfm as the optimal benchmark. In cases of hood(s) that operates outside of 100 cfm (-10%, +2-10%), determine the benchmark velocity of the hood.
9.
  - a. This is established previously or determined by ensuring the face velocity is 50 cfm/ft of hood width (if 2 ft in depth) or 25 cfm/square ft. of hood work area, and able to pass visible methods (smoke) observations or tracer gas testing.

- b. The determined benchmark range for specific hood face velocity can range from 80-140 fpm as long as it also passes visible methods or tracer gas tests.

Note: Most laboratory experts agree that velocities above 150 are excessive at operating sash height and may cause turbulent flow creating more potential leakage” (AIHA/ANSI, 2003).

10. Determine the average face velocity from the measurements.
  - a. Fume Hoods with the standard 100 fpm benchmark, when face velocities exceed the 90-120 fpm range, 100 fpm (-10%, +20%) shall be corrected prior to continued use.
  - b. Hoods with a determined benchmark that exceed the 80-140 fpm range, or fail the visual method (smoke) test, shall be corrected prior to continued use. In the case of a failed hood test, then place a **Hood Test Failure/Do not Use** label on the hood.
  - c. Notify the user, representatives of the department, Facilities Services, and the EHS operational safety manager or director of hood test failure results. The fume hood should be taken out of service until repairs can be made and the proper face velocity and a satisfactory visual test is achieved.

For hoods that the hood test indicated above, place a label on the hood with the test date, average face velocity and name of the tester.

## REFERENCES

American Industrial Hygiene Association. 2003. “American National Standard for Laboratory Ventilation.” ANSI/AIHA Z9.5 Fairfax, VA.

10 Code of Federal Regulations 20.1701 Use of process or other engineering controls. Available at <https://www.nrc.gov/reading-rm/doc-collections/cfr/part020/full-text.html#part020-1701>



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### REVISION TRACKER

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|------------|-------------------|--------------------|
| Revision 1 | September 1, 2008 | Original Procedure |
| Revision 2 | Sept. 18, 2018    | Revised Procedure  |