



Standard Practice RSP 6	Radioisotope Fume Hood Use Effective Date January 31, 1999
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I. PURPOSE

The purpose of this Standard Practice is to ensure adequate protection from airborne radioactive material for users of unsealed radioactive material. This Standard Practice establishes criteria for determining when radioisotope fume hoods must be used.

II. POLICY

Fume hoods must be used when handling unsealed radioactive material in quantities equal to or greater than the criteria set forth in this Standard Practice.

III. SCOPE

This standard practice applies to all individuals using unsealed radioisotopes at the University or University-controlled sites.

IV. REFERENCES

- A. International Commission on Radiological Protection -- Report of Committee V
- B. US Nuclear Regulatory Commission -- Draft Regulatory Guide DG-0005, Applications for Licenses of Broad Scope.

V. DEFINITIONS

- A. Fume hood: for the purpose of this Standard Practice, a fume hood is a boxlike structure with one open side. The open side is provided with a moveable sash that can close the opening. Provisions are made for exhausting air from the top or back of the hood, and adjustable internal baffles are provided to obtain proper air flow distribution across the open face.
- B. Radioactive material hood: A fume hood designated by the Safety Office for use of radioactive material. Hoods are designated to reduce the number of potentially contaminated equipment on campus. In the Edwin C. James Research Facility, only hoods that exhaust through the upper exhaust plenum may be used for radioactive material.
- C. Setup work as used in this policy: placement and setup of equipment, apparatus and other material in the hood. Hazardous material must either not be present, or present only in a quantity or a manner that precludes the generation of hazardous airborne emissions. Only materials in quantities and/or forms that can be safely handled on an open lab bench can be present in a hood during setup work.

VI. RESPONSIBILITIES

- A. The Safety and Environmental Health Office is the office of primary responsibility for ensuring that hoods are tested annually for operability and supplying training on this Standard Practice. The Safety Office will designate which hoods can be used for radioactive material use.
- B. Department Chair/Director or designee is responsible for assigning laboratories to researchers based on intended hood use. Radioactive material can only be used in hoods that are designated for radioactive material use by the Safety Office.
- C. Each affected individual is responsible for adhering to the following work practices:
 - 1. The individual shall not lean into the hood so that his/her head is inside the plane of the hood face without adequate respiratory and personal protection, except for setup work.
 - 2. Equipment in the hood must not block air flow to the slots in the baffle.
 - 3. Equipment that might be a source of emission should not be placed closer than 6 inches from the plane of the hood face. Workers should not stand closer than 6 inches from the face of the hood.
 - 4. Flammable liquids should not be stored permanently in the cabinet under the hood unless that cabinet meets the requirements of ANSI/NFPA 30 and 45 for flammable liquid storage.
 - 5. The hood sash or panels shall not be removed except for setup work.
 - 6. The hood sash or panels must be closed to the maximum position possible while still allowing comfortable working conditions. The hood sash must not be opened beyond the tested maximum sash opening except for setup work.
 - 7. A hood that has failed the annual hood test shall not be used for the control of airborne radioisotope contaminants unless it is repaired, and has passed an air flow test.
 - 8. Fume hood users shall not conduct servicing of any kind unless authorized to do so, this includes scheduled, modified, or unscheduled maintenance. All servicing will be performed by maintenance or facility personnel.
 - 9. Radioactive material must be handled in a fume hood when using quantities equal to or greater than the criteria set forth in this Standard Practice. Smaller quantities can be used in the fume hood or on an open bench at the discretion of the researcher. The presence of nonradioactive material hazards must also be accounted for in determining if a procedure must be performed in a hood.

VII. CRITERIA FOR FUME HOOD USE

Tables 1 through 3 contain general guidelines that must be used to determine if a hood is required for a specific isotope, quantity, and use. Table 1 is used to classify isotopes according to their

radiotoxicity, an expanded table is available in the Safety Office if the isotope in question is not present in this table. Table 2 is used to determine the quantity of an isotope that under general laboratory use conditions would require a hood. Table 3 contains correction factors for various uses of the isotope. These guidelines were established for common laboratory usage, in some cases hoods should be used for smaller quantities if the procedure has the potential for producing airborne contaminants.

Table 1: Radiotoxicity Classification of Isotopes, based on half-life, emission type and energy level, and target organ for the isotope.

Group	Isotopes
1. Very High Radiotoxicity	Ra-226, Ra-228, Po-210 (primarily alpha emitters)
2. High Radiotoxicity	I-125, Cl-36, Sb-125, ...
3. Moderate Radiotoxicity	P-32, P-33, S-35, C-14, ...
4. Low Radiotoxicity	H-3, Tc-99m, Kr-85, ...

Table 2: Hood requirements based on radiotoxicity classification

Group	Amount requiring hood use:
1. Very High Radiotoxicity	0.01 mCi or Ci
2. High Radiotoxicity	0.10 mCi or 100 Ci
3. Moderate Radiotoxicity	1.00 mCi or Ci
4. Low Radiotoxicity	10.00 mCi or Ci

Table 3: Factors for modifying Table 2 quantities for different types of use:

	Use	Factor
1.	Simple Storage	x 100
2.	Very simple wet operations (e.g. preparation of aliquots of stock solutions)	x 10
3.	Normal chemical operations (e.g. analysis, simple chemical preparations)	x 1
4.	Complex wet operations (e.g. multiple operations with complex glass apparatus)	x 0.1
5.	Simple dry operations (e.g. manipulation of powders)	x 0.1
6.	Exposure of non-occupational persons (e.g. demonstrations)	x 0.1
7.	work with volatile radioactive compounds (such as unbound iodine isotopes) or heating liquids containing radioactive compounds that would increase the evaporation rate	x 0.1