HARVARD
Campus Services
ENVIRONMENTAL HEALTH & SAFETY

Radioactive Materials Reference Sheet:

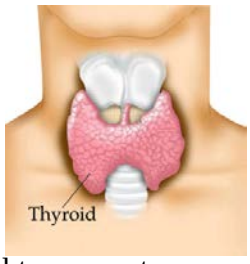
Iodine-125

Half-life	**: 60.14 days**	
Type of Emitter	**: Gamma**	
Gamma Energy	**: 0.0355 MeV**	
Distance Traveled in Air	**: 135 m : 443 ft**	**(approx. for 99% reduction)**
Distance Traveled in Lead	**: 0.15 mm**	**(approx. for 99% reduction)**

Annual Intake Limits

Inhalation	**: 60 μCi**
Ingestion	**: 40 μCi**

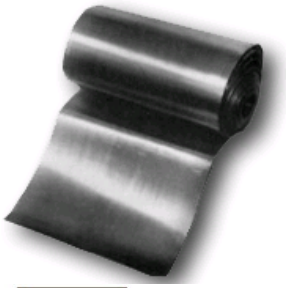
CONCERNS



^{125}I is a low energy gamma emitter that does not usually present an external exposure hazard. However, due to its affinity for the thyroid gland it is an internal exposure hazard. About 30% of ingested radioiodine concentrates in the thyroid with an effective half-life of about six weeks. Stock vials should be purged prior to use, as they will contain $^{125}I_2$ (gas) in the airspace. To minimize exposures, purge the stock vial airspace through a trap containing activated charcoal to prevent an initial release of built-up volatilized activity when opened. If possible, remove radioiodine with a Hamilton syringe through the septum. Avoid acidic solutions and freezing (store at room temp.). Some compounds may absorb through gloves and skin.

Obtain a thyroid scan before and after performing an iodination. The scan needs to be completed at least 24 hours, and no longer than 14 days, after the iodination. Quarterly scans may be required for those who work with iodine but do not perform iodinations.

SHIELDING



- Use 3 mm (1/8 inch) thick lead for mCi quantities. Lead roof flashing is well suited for this and can be readily purchased at a hardware store or lumber yard.

DETECTION

- Use a survey meter with a sodium iodide probe to detect ^{125}I (detection efficiency of approx. 30% (under ideal conditions)).
- Count wipes in a Liquid Scintillation Counter to detect removable ^{125}I contamination.

Laboratory Safety
46 Blackstone Street, Cambridge, MA 02139 | T: 617.496.3797 | F: 617.496.5509
www.ehs.harvard.edu | email: lab_safety@harvard.edu

SPECIFIC EQUIPMENT / SUPPLIES

In addition to general equipment, the following is required for specific use of ^{125}I :

- A survey meter with a Sodium Iodide Probe
- Thin lead (3 mm) shielding or lead roof flashing for mCi quantities.
- TLD ring (for quantities greater than 1 mCi).

SAFETY RULES FOR ^{125}I

- Follow General Safety Precautions for all isotopes.

Specific Recommendations:

WHILE WORKING

- Minimize the number of times the primary container is opened and immediately reseal after each use. If used repeatedly, aliquot the required amounts into separate storage vials. If possible, remove with a Hamilton syringe through the septum.
- Na ^{125}I can penetrate through gloves. Wear two pairs and change the outer pair after every step in the iodination procedure. Frequently monitor your hands.
- Work with volatile iodine in fume hoods monitored by the RPO.
- Perform necessary reactions in original shipping vial, working through the septum with a syringe. Stock vials should be purged prior to use by inserting the needle of both a charcoal trap and an air filled syringe through the septum of the stock vial. Be certain that the needles are in the airspace (not liquid) of the stock vial and carefully push the air from the syringe into the vial. Dispose of the syringe in the ^{125}I sharps waste and the trap in the ^{125}I solid waste. Do not recap needles.
- If the iodination procedure requires a vacuum withdrawal of any substance containing iodine, a charcoal trap should be placed between the collection flask and the vacuum source to protect the house vacuum line from contamination.
- Use transfer pipettes, spill trays and absorbent coverings to confine contamination.
- Store $Na^{125}I$ solutions in a refrigerator or at room temperature in an approved hood. Do not freeze and avoid heating $Na^{125}I$ solutions, as this will result in volatilization.
- Maintain a pH greater than 7 in $Na^{125}I$ solutions to reduce volatilization. Have reducing agents (i.e. Metabisulfate) available when using $Na^{125}I$.
- In the event of a spill outside the hood involving volatile $Na^{125}I$, hold your breath and vacate the area, closing the doors behind you. Do not permit anyone to enter and contact the RPO immediately. Leave the ventilation system on.

POST-USE

- Dispose of ^{125}I waste according to the waste disposal guidelines. If by sink disposal, ensure that it is soluble in water and does not exceed the posted limit (1 μCi daily, if only one radionuclide is being disposed of) unless otherwise authorized by the Radiation Safety Committee in the permit.
- ^{125}I waste in mCi amounts should be shielded. ^{125}I waste should be segregated from other radioactive waste and stored in a spot away from work and high traffic areas.