I-125 Guidance Information

Handling Precautions: Iodine-125

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

**Annual Intake Limits**

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

**Concerns**

125I 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.

![Thyroid](image)

Stock vials should be purged prior to use, as they will contain 125I₂ (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 µCi quantities. Lead roof flashing is well suited for this and can be readily purchased at a hardware store or lumber yard.

![Lead](image)

**Detection**

Use a survey meter with a sodium iodide probe to detect 125I (detection efficiency of approx. 30% (under ideal conditions)).

Count wipes in a Liquid Scintillation Counter to detect removable 125I contamination.

**Specific Equipment/Supplies**
In addition to general equipment, the following is required for specific use of 125I:

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

**Safety Rules for 125I**

Follow the established safety policies found in the [UCSF Radiation Safety Manual](#) [7] 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 125I 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 the 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 125I sharps waste and the
trap in the 125I 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 125I solutions in a refrigerator or at room temperature in an approved hood. Do not freeze and avoid heating Na 125I solutions, as this will result in volatilization.
- Maintain a pH greater than 7 in Na 125I solutions to reduce volatilization. Have reducing agents (i.e. Metabisulfate) available when using Na 125I.
- In the event of a spill outside the hood involving volatile Na 125I, 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.

Specific Recommendations: Post Use

- Dispose of 125I waste according to the waste disposal guidelines found in the UCSF Radiation Safety Manual [7].
- 125I waste in μCi amounts should be shielded. 125I waste should be segregated from other radioactive waste and stored in a spot away from work and high traffic areas.

We would like to thank Harvard University for the information provided in this radiation guide.

© 2016 The Regents of the University of California

Source URL: https://ehs.ucsf.edu/i-125-guidance-information

Links: