

# IODINE-125

## [<sup>125</sup>I]

### Physical and Radiological Data

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Physical half-life:	60.1 days
Low energy gamma emitter:	0.035 MeV (max)
Half value layer in air:	2.4 meters = 240 cm
Half value layer in tissue:	0.026 meters = 2.6 cm
Half value layer in lead:	0.02 mm
Critical organ:	Thyroid

### Concerns

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- ◆ Volatility.  
Many <sup>125</sup>I solutions are slightly volatile and certain reactions release volatile products. The thyroid is the site for internal deposition and low activity intakes can cause high thyroid doses. Volatility may be reduced by keeping <sup>125</sup>I solutions at room temperature and at alkaline pH. <sup>125</sup>I should be used and stored within a fume hood.
- ◆ Radiation exposure in air over an open vial.  
Millicurie amounts of <sup>125</sup>I prove to be an exposure hazard at short distances. The radiation exposure from an unshielded source can be greatly reduced by distance. It is recommended that these solutions be remotely handled with the use of tools.

### Shielding

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- ◆ Thin sheets of lead are most highly recommended for shielding <sup>125</sup>I. Usually 0.28 mm thickness is sufficient.
- ◆ Leaded plexiglas/plastic can also effectively shield <sup>125</sup>I. These alternatives have the added benefit of shielding beta emitters and are transparent.

## General Safety Precautions

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- ◆ Contact the RSO before beginning work with  $^{125}\text{I}$ .  
A thyroid survey must be performed by the RSO before and after a person works with  $^{125}\text{I}$ .
- ◆ All persons handling  $^{125}\text{I}$  must wear a whole body dosimeter and ring badge.  
Ring badges should be worn on the hand which is most used for handling vials, pipettes, etc.
- ◆ All persons handling  $^{125}\text{I}$  must wear a lab coat and disposable gloves.  
Safety glasses are recommended.
- ◆ Do not work directly over an open vial or container of  $^{125}\text{I}$ .
- ◆ Do not pipette  $^{125}\text{I}$  by mouth.
- ◆ Pipettes should be committed solely to  $^{125}\text{I}$  use and clearly labeled.
- ◆ Always use lead shields in areas of work, storage, and waste storage.  
Frequently monitor exposure levels in front of the shield to be sure the protection is adequate.
- ◆ Always have a radiation detection instrument in operation when handling  $^{125}\text{I}$ .  
Check the batteries before beginning. A single sheet of plastic wrap should be kept around the detection window to avoid contaminating it.
- ◆ Frequently monitor gloves, work area, floor, and shoes for contamination.
- ◆ Notify the RSO if you would like more frequent thyroid surveys.

## Contamination

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A radiation level greater than or equal to three times background is considered contamination. Here are some tips on what to do when contamination is found.

- ◆ If contamination is found on your hands:  
Do not touch anything, this may spread contamination to door handles, etc.  
Wash thoroughly with non-abrasive soap and water, *blot* dry. Do not rub or abrade skin. Contact the RSO if this does not remove the contamination.  
Monitor areas that may have been touched.
- ◆ If contamination is found on your shoes/clothing:  
Do not walk around in contaminated shoes. Remove any contaminated clothes and use a commercial contamination remover to decontaminate shoes. Survey the area and floor to determine the extent of contamination. Contact the RSO.

- ◆ If contamination is found on the floor:  
Immediately mark off the area and prevent anyone from walking near the contamination. Use a commercial decontaminant (i.e. Radiacwash) with paper towels to clean the area. Swipe the paper towels only once across the area and discard (in radioactive waste). To use a sweeping motion would only spread the contamination. Be sure to monitor shoes. Contact the RSO.
  
- ◆ If contamination is found on the countertop, lab equipment, etc:  
Use a commercial contamination remover and paper towels to clean the area. Place equipment in a shielded area if contamination cannot be removed.

## **Decay Table**

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<b>DAYS</b>	<b>DECAY FRACTION</b>	<b>% ACTIVITY REMAINING</b>
0	1.000	100
10	0.891	89.1
20	0.794	79.4
30	0.707	70.7
40	0.630	63.0
50	0.561	56.1
60	0.500	50.0
70	0.445	44.5
80	0.397	39.7
90	0.354	35.4
100	0.315	31.5
110	0.281	28.1
120	0.250	25.0
600 (10 Half Lives)	0.001	0.10