

# Carbon-14

## [<sup>14</sup>C]

### Physical and Radiological Data

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Physical half-life:	5730 years
Low energy beta emitter:	0.156 MeV (max), 0.049 MeV (avg)
Maximum range in air:	24 cm = 10 in.
Maximum range in water/tissue:	0.28 mm = 0.012 in.
Critical organs:	Fat tissue, bone

### Concerns

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- ◆ Monitoring  
<sup>14</sup>C can be monitored with a radiation survey instrument. However, wipe testing is the best method for detecting <sup>14</sup>C and should be done frequently to monitor possible contamination.
- ◆ Internal absorption  
Avoid contact with skin (absorption), ingesting, inhaling, and injecting <sup>14</sup>C (all routes of exposure). Wearing double gloves and changing gloves often will prevent skin contamination.

### Shielding

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- ◆ None required; mCi quantities not an external radiation hazard.

### General Safety Precautions

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- ◆ All persons handling <sup>14</sup>C must wear a lab coat and disposable gloves. Safety glasses are recommended.
- ◆ Do not work directly over an open vial or container of <sup>14</sup>C.
- ◆ Do not pipette <sup>14</sup>C by mouth.
- ◆ Pipettes should be committed solely to <sup>14</sup>C use and clearly labeled.
- ◆ Wipe test regularly.

## 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. Wipe test areas that may have been touched.
- ◆ If contamination is found on your shoes/clothing:  
Do not walk around in contaminated shoes. Contaminated clothing will need to be removed, but some shoes may be decontaminated with a commercial contamination remover. Wipe test 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 wipe test shoes. Contact the RSO.
- ◆ If contamination is found on the countertop, lab equipment, etc:  
Use a commercial decontaminant and paper towels to clean the area. Place equipment in a designated area if contamination cannot be removed.

## Decay Table

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<b>YEARS</b>	<b>DECAY FRACTION</b>	<b>% ACTIVITY REMAINING</b>
0	1.000	100
100	0.988	98.8
200	0.976	97.6
300	0.964	96.4
400	0.953	95.3
500	0.941	94.1
600	0.929	92.9
700	0.919	91.9
800	0.908	90.8
900	0.897	89.7
1000	0.886	88.6
1100	0.875	87.5
1200	0.865	86.5