

RADIONUCLIDE SAFETY DATA SHEET

NUCLIDE: C-14

FORMS: SOLUBLE , EXCEPT GASEOUS

PHYSICAL CHARACTERISTICS:

HALF-LIFE: 5730 years

TYPE DECAY: beta⁻
maximum energy: 0.156 MeV

Hazard category: C- level (low hazard) : 0.1 to 10 mCi
B - level (Moderate hazard) : > 10 mCi to 1.0 Ci
A - level (High hazard) : > 1.0 Ci

EXTERNAL RADIATION HAZARDS AND SHIELDING:

The maximum range of these betas is ~1 ft in air and 0.0065 in (0.17 mm) in glass. The external hazard of this isotope is minimal, e.g., the glass vial holding the isotope will provide sufficient shielding to stop the betas. If skin is uniformly contaminated with C¹⁴, 1 microcurie/ cm² will deliver a dose of 1,100 mrems/hr to basal cells of the skin. (Porter Consultants to NRC)

HAZARDS IF INTERNALLY DEPOSITED:

The ALARA Annual Limit of Intake (based on NRC ALI) which will result in a whole body exposure of 500 mrem or maximum recommended doses (by the NCRP) to hematopoietic or spermatogonial stem cell nuclei is as follows:

Whole body200 µCi (inorganic, soluble)
Stem cell nuclei...1000 µCi (DNA precursors)
Stem cell nuclei...88 µCi (RNA precursors)

DOSIMETRY AND BIOASSAY REQUIREMENTS:

Film badges and dosimeter rings are not appropriate for monitoring C¹⁴ exposure.

Urine assays may be required after spills or contamination incidents.

SPECIAL PROBLEMS AND PRECAUTIONS:

1. Always wear protective gloves to keep contamination from skin. Change gloves often.
2. C¹⁴ beta particles have very low energies. G.M. survey meters are not very efficient at such energies. Smear surveys required.
3. All waste in a C¹⁴ work areas is considered to be contaminated. Keep work areas free of unnecessary items. Segregate wastes to those with H³ and C¹⁴ only.
4. Limit of soluble waste to sewer is 100 microcuries/ day per lab.

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