

RADIONUCLIDE SAFETY DATA SHEET

NUCLIDE: Xe133

FORMS: GASEOUS, SOLUBLE

PHYSICAL CHARACTERISTICS:

HALF-LIFE: 5.29 days

TYPE DECAY: maximum energy 346 keV
gamma photons 81 keV (35 % + 65 % IC)

Hazard category: C- level (low hazard) : 0.100 to 10 mCi
B - level (Moderate hazard) : > 10 mCi to 1000 mCi
A - level (High hazard) : > greater than 1000 mCi

EXTERNAL RADIATION HAZARDS AND SHIELDING:

The gamma exposure rate at 1 cm from 1 mCi of Xe133 shielded for betas is 150 mR/hr, and at 1 foot will be 0.17 mR/hr. The half and tenth values of lead for this gamma are 0.003 and 0.015 cm respectively. This means that lead sheets or regular lead shipping pig will be sufficient for shielding the material.

The maximum range of the betas is about 0.002 inches in lead. Therefore, the use of the lead shield for storage will provide adequate shielding for the beta particles. If skin is uniformly contaminated with Xe133, 1 microcurie /cm² deliver a dose of 4200 mrems/hr to the basal cells of the skin.

HAZARDS IF INTERNALLY DEPOSITED:

It is important to avoid ingestion, inhalation and/ or skin contamination.

The NCRP MPC for Xe133 is 10E-5 uCi/ml for 40 hr/wk.

DOSIMETRY AND BIOASSAY REQUIREMENTS:

Dosimeter rings are required for handling 5 millicuries or more at one time or millicurie levels on a frequent (daily) basis.

Film badges may be used for integrating exposure on monthly basis.

SPECIAL PROBLEMS AND PRECAUTIONS:

1. Xe133 is heavier than air and hard to be kept in solution form, therefore, one should work in well ventilated areas.
2. Survey frequently. Change gloves often.
3. Xe133 in saline tends to leak out of syringes during storage and tends to be absorbed to the syringes in significant amounts in just a few minutes. Therefore syringes containing Xe133 should be regarded as leakage and radiation sources, and continued to be regarded as such even after being emptied.
4. Segregated wastes to those with half-lives between 4 to 19 days.
5. Limit of soluble waste to sewer: 100 microcuries per day per lab.

