

RADIONUCLIDE SAFETY DATA SHEET

NUCLIDE: Fe-59

FORMS: ALL SOLUBLE

PHYSICAL CHARACTERISTICS:

HALF-LIFE: 44.5 days

TYPE DECAY: beta⁻

beta maximum energies:

1.565 MeV (0.2 %)

0.465 MeV (53.1%)

0.273 MeV (45.2%)

0.131 MeV (1.4%)

gammas:

1.292 MeV (43.2%)

1.099 MeV (56.5%)

0.192 MeV (3.1%)

0.143 MeV (1.0%)

Hazard category: C- level (low hazard) : 0.01 to 1 millicurie

B - level (Moderate hazard) : > 1 to 100 mCi

A - level (High hazard) : > 100 millicuries

EXTERNAL RADIATION HAZARDS AND SHIELDING:

The maximum ranges of the betas are ~22 feet in air, 0.14 inch in glass and 0.25 inch in lucite.

The gamma exposure rate at 1 cm from 1 mCi is 6200 mR/hr. The exposure rate varies directly with activity and inversely as the square of the distance. The half & tenth value layer of lead is 1.5 cm & 4.5 cm respectively.

HAZARDS IF INTERNALLY DEPOSITED:

Fe-59 concentrates in the spleen with a biological half life of approximately 600 days, and an effective half life of approximately 42 days. The maximum permissible body burden (MPBB) is 2.0 uCi, based on Stanford Guideline of whole body dose not exceeding 500 mRem/yr. The Annual Limit of Intake (ALI) is 82 uCi.

DOSIMETRY AND BIOASSAY REQUIREMENTS:

Film badges and dosimeter rings are required if 5 millicuries are handled at any one time or millicurie levels are handled on a frequent (daily) basis.

Urine assays may be required after spills or contamination incidents.

SPECIAL PROBLEMS AND PRECAUTIONS:

1. Work behind shielding consisting of lucite (inner) and lead (outer). Handle stock solution vials in shields or use tongs or forceps.
2. Survey frequently while working and change gloves often.
3. Segregate wastes to those with half-lives between 20 and 64 days.
4. Limit of soluble waste to sewer 10 microcuries/ day per lab.